Chemical Week

June 23, 1951

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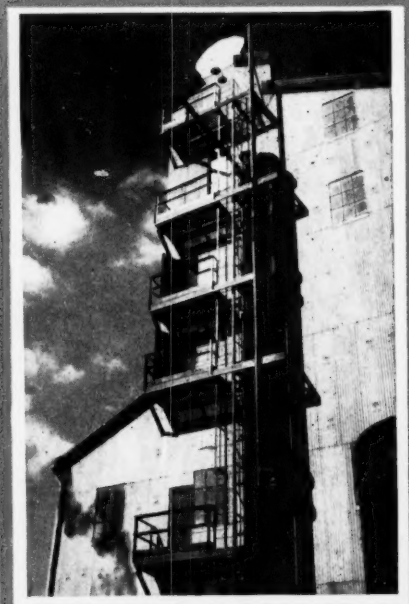

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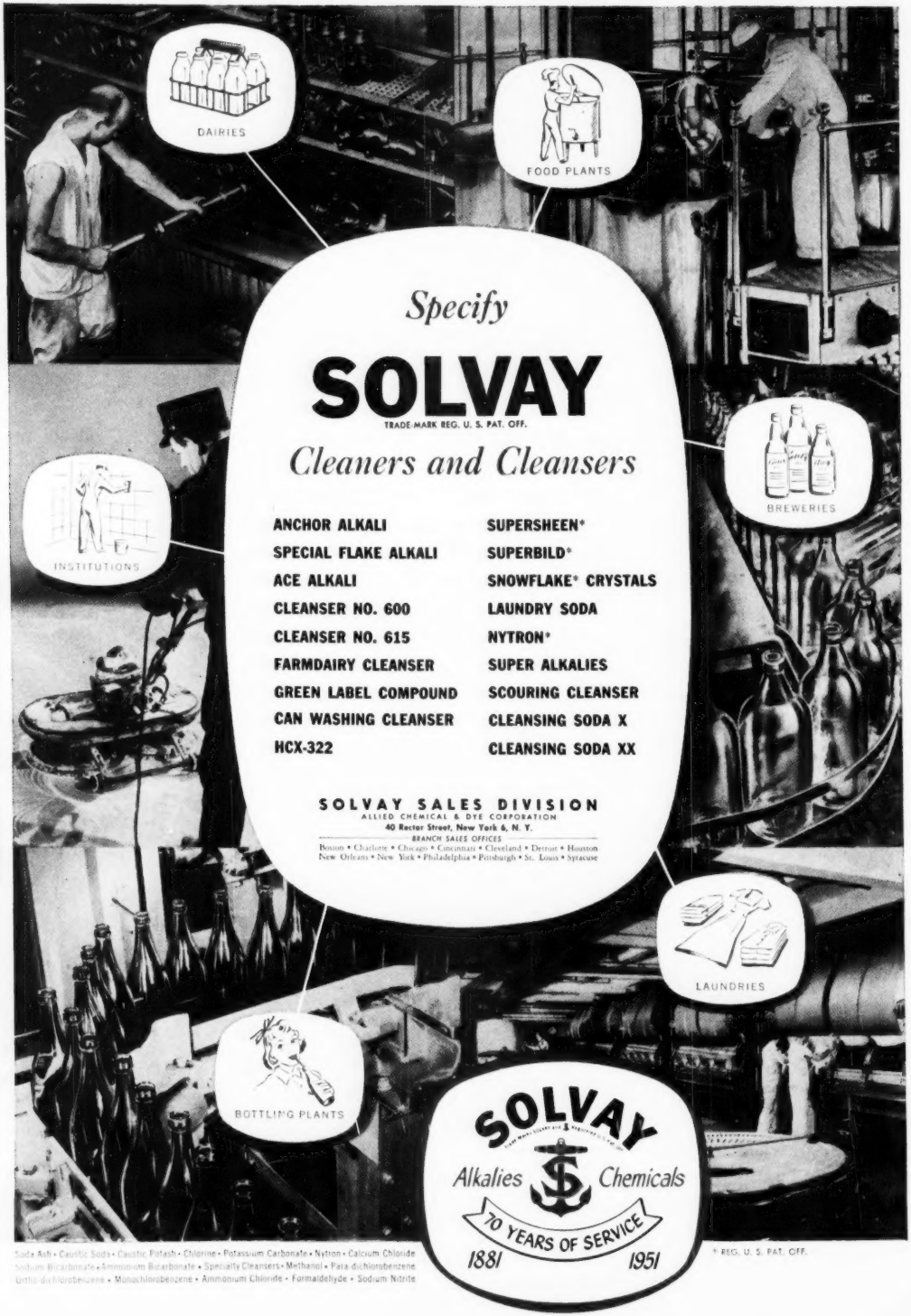

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Chemical Week

Volume 68 Number 23

June 23, 1951

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OPINION . . . . .

The Why of Sulfur

If you talk to sulfur producers, Washington officials, and sulfur consumers, you'll hear them voice varying opinions as to who is responsible for the existing sulfur shortage. Some will lay the blame at the door of U. S. producers, claim that they were lacking in foresight; others will accuse foreign countries of being selfish and lax in developing their own resources; some will contend that no critical shortage does exist, that the hue and cry is to justify future price increases. None of these statements is completely true though there may be a germ of truth in each. Here, in our opinion, is what has happened, why it did, what is in the offing for sulfur:

Even a casual appraisal of statistics will reveal that U. S. producers of brimstone have been far from inactive in boosting production. In 1950, for instance, output soared to a robust 5,350,000 long tons—up a full 146% over the 1935-1939 level. Sales in that year, however, stood at 5,700,000 tons. This, obviously, means that some 350,000 tons had to be withdrawn from stockpiles. (Prior to World War II we maintained two-year stockpiles; today our above-ground reserves are in the dangerously low six-month bracket.)

There is no doubt that existing brimstone facilities are being pushed to the limit. Too, heavy investments are being made by U. S. producers in exploration ventures—in ventures which may well not pay off with sulfur pegged at current prices. And the success of these efforts to uncover new resources is far from assured. There are, in total, some 200 salt domes in the Gulf Coast area, most of which have been uncovered by the fine-tooth combing that oil companies have given the region. Of these 200, only about 100 are in sulfur-favorable locations. Less than a dozen hold much promise. It would be sheer folly to be optimistic regarding the future of many of these; the probability of any discovery of significant tonnage resources is remote.

But one fact is clear. The U. S. can produce enough sulfur to meet its own industrial needs. (Consumption last year was only about 4 million tons.) However, with our international policy of strengthening our Allies abroad, we are committed to shipping sizable tonnages of our brimstone to foreign markets. Therein is the nub of our problem.

We, in the Gulf Coast area, have been producing brimstone cheaply. Many foreign countries have come, over the years and particularly in the rebuilding of war-destroyed acid plants, to forsake their historical sources (e.g., pyrites) and to avail themselves of the cheaper, and less expensively processed brimstone. Since the war they have been loath to turn to higher cost raw materials. One yardstick: Spanish exports of pyrites were 1,116,000 tons in 1939, only 658,000 tons in 1950.

It is a natural reluctance—an outcropping of the normal human desire to buy the best article obtainable at the cheapest price. But the reasoning is a selfish one, puts a burden on the U. S.

Great Britain, which takes 400,000 tons of sulfur annually from the U. S., has been laggard in reconverting its facilities to the use of pyrites. It would cost money, take time. And doing business under a socialist regime is difficult, stultifying to enterprise. There are many roadblocks to be cleared before any British businessman can act; and there is little incentive to do so.

In some respects, the British attitude may be looked upon as something parallel to this: A Britisher would like an automobile; an English-made Daimler costs $3,000; a U. S.-made Chevrolet, $2,000. Why buy the more expensive car? Approach Parliament, urge that representations be made so that Chevrolets will be allocated in the U. S., a percentage of all those made channelled to Britain. Result: Get a good car, cheaper.

Perhaps a kindred reasoning obtains in sulfur. Why pay for expensive-to-use pyrites (and plant conversions) when a little agitation can get you the cheaper brimstone you prefer? (A criterion of the activity in sulfur solicitation: When Prime Minister Attlee visited President Truman last December, one discussion centered on lining up a 10,000-ton shipment of brimstone.)

The same pattern obtains, by and large, throughout the world. Some countries, even as Britain is at long-last doing, are making efforts to adapt their economies to the sulfur shortage . . . notably Canada and Belgium. Others—and we shipped sulfur to 34 nations last year—are being dilatory.

In the next few months, and probably for the next year, we will see more and more pressure put on our

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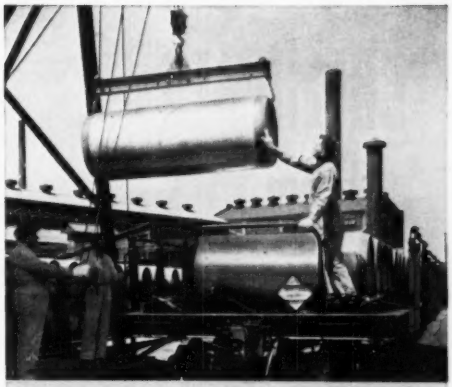

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Benzyl Chloride	p-Nitrobenzoyl Chloride
Caustic Soda	Phenyl Isocyanate
Chlorine	Sodium Sulfhydrate
Chlorobenzenes	Sodium Sulfide

• • •

For the complete list of Hooker Chemicals, send for Bulletin 100. For properties, specifications and typical uses of any chemicals listed here, ask for Technical Data Sheets. Please request them on your business letterhead.

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OPINION

government to allocate larger tonnages of brimstone to various foreign nations. There may be some logic in the apportionment of supplies, but, in the main, the exigencies of international politics will be dominant. And, of course, we must not let short-sighted selfishness warp our thinking. Rather, we must strive to see that every ton of sulphur is placed where it will do the most good—to strengthen and defend not only our country but our Allies as well. Nonetheless, the laggards must be prodded, cajoled, urged to look ahead, not to rely on an ever-bountiful supply of U. S. material.

As yet, we have not felt the sulfur pinch in the U. S. as severely as we soon shall. Many consumers had fair-sized inventories. Now these stocks are running out and a hand-to-mouth situation will soon prevail. Too, you can expect to hear of a spate of representations which will be made by chemical, rubber, agricultural and other interests. It's going to be a tug-of-war as to who gets what.

Any relief from the sulfur dearth is far from immediate. Until more sources are exploited, until more conversions to pyrites and alternative materials are made, brimstone is going to be hard to come by. Moreover, if you want to look a few years ahead, don't be surprised to see the price of brimstone substantially above the present $22 per ton.

—**W. Alec Jordan,** *Editor.*

Trend: Rigid Specs

To The Editor: . . . I certainly wish to commend Chemical Industries Week for the excellent review on the utilization of emulsifiers (May 26). . . . The treatment is clear, concise, and yet sufficiently inclusive to give those of us who are concerned with only a phase of emulsifier utilization a broader picture of the wide applicability of these products.

In regard to the section on resin polymerization, I feel that greater emphasis on the increasing importance of synthetic emulsifiers in emulsion polymerization could have been made. . . .

The wide range of available synthetics of specific characteristics affords the opportunity of preparing "tailor-made" resin emulsions with specific characteristics. Conventional soaps, even when highly purified, have pH, chemical and stability limitations which preclude their use in many resin emulsions.

Our organization feels that the future development in the field of synthetic resin emulsions will tend towards the preparation of products for specific uses under rigid specifications, and that this factor would require the use of synthetic emulsifiers under equally rigid specifications. . . .

Harold Naidus
Director of Research
American Polymer Corporation
Peabody, Mass.

Key: Domestic User

To The Editor: . . . In your Market Letter (June 2) we noticed the following:

"Copper sulphate to the non-contract user is practically non-existent. Those who can get it are paying 14½¢ a pound, up 2¢ from last week. . . ."

May we call your attention to the fact that for the legitimate domestic consumer we have available copper sulphate crystals at $9.45 per 100 lbs. ex plant New York . . . which is and has been our ceiling price. . . .

. . . There is no reason for any domestic user, contract or non-contract, to pay any more than the . . . quoted figure. . . .

Silas Besthoff,
Vice President,
Faesy & Besthoff, Inc.,
New York, N. Y.

What CW said was true in part but not the complete story. Manufacturers and basic suppliers of copper sulphate are cooperating with a government request to pay primary attention to U. S. requirements, curb exports which might crimp domestic supplies. Hence, copper sulphate is available, as Reader Besthoff says, to legitimate domestic consumers at list prices; the higher bids are mainly from traders trying to snare supplies for export sale. —Ed.

Comprehensive

To The Editor: . . . I have just read your recent article on Emulsifiers . . . as have several of my associates. . . . We feel it is . . . a very comprehensive article. . . .

J. Vernon Steinle
Research and
Development Vice-President,
S. C. Johnson & Son, Inc.,
Racine, Wisc.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 18, N. Y.

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If you're looking for unusual rigidity *and* toughness in your products, you'll want to look into Naugatuck's new plastic resins—its Kralastic styrene copolymers. Read what Kralastic has done in this tough pipe-line job, then send the coupon below for your *free* experimental samples and full technical data on the specific advantages Kralastic can bring to *your* product.

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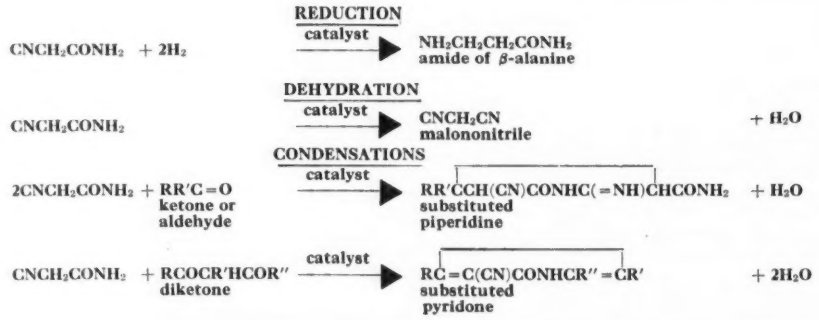
purity	●99.0% min.
melting point	●119.0-122.0°C (meniscus to complete melt)
ash	●.05% max.
solubility	●1 gm. completely soluble 9 gm.dist.H_2O

• Typical reactions of CYANOACETAMIDE •



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NEWSLETTER

Major capacity expansions for several key commodities are still in the forefront of chemical news:

Monsanto Chemical Co., which only this year completed its sixth (and world's largest) elemental phosphorus furnace at Monsanto, Tenn. (CIW, Jan. 20), is planning to start construction this summer of a furnace at Soda Springs, Idaho. Completion is expected by late 1952. Facilities will be installed for an integrated operation—mining of phosphate rock, processing, and reduction to phosphorus. Additional furnaces are slated for the same location.

Allied's Solvay Process Division will spend over $25 million during the next two years to boost synthetic ammonia capacity by about 120,000 tons a year. Locations: both Hopewell, Va., and South Point, Ohio. Part of the expenditure will pay for conversion of present units from coke to natural gas as a source of hydrogen (CIW Newsletter, March 31). The Solvay program is part of an over-all industry expansion that will up ammonia capacity from 1,700,000 tons to 2,200,000 tons.

Pittsburgh Plate Glass Co. is tripling its production capacity for Hi-Sil (calcium silicate) and Silene (silica) rubber pigments. The new Silene plant is scheduled to operate this fall, the Hi-Sil plant a year later. Hi-Sil also has non-rubber uses as an adsorbent.

The new caustic-chlorine units of PPG's subsidiary, Southern Alkali Corp. (Lake Charles, La.) will come on stream this month.

Thiokol Corp. will build a $400,000 plant at Moss Point, Miss., to manufacture chemicals used in synthetic rubber.

But in spite of all the expansion, the industry is still plagued by shortages and the prospect of shortages:

The growing scarcity of graphite electrodes may seriously retard Washington's program for aluminum and magnesium expansion. Major factor behind the shortage: the stepped-up atomic energy program's sky-high needs for graphite. Contributory factor is the steel and chemical industries' increased use of graphite electrodes.

The military services' switch to all-temperature greases (CIW, May 26), may put a crimp on lithium supplies. In fact, it's a moot point whether present lithium hydroxide capacity is sufficient to provide all the lithium greases that would be called for under the military program.

A robust expansion of activities was voted by the Manufacturing Chemists' Association at its annual meeting last week. Topping the list—and supporting the rest—is a 45% increase in the Association's operating budget. New funds will be provided for a broadened public relations program, legal counsel, and guidance on over-all and day-to-day industry problems. Also: more—and rotating—directorships.

Corporate news of moment this week: Godfrey L. Cabot Co. (Boston), prominent carbon black producer, has taken a financial interest in Willsboro Mining Co., Willsboro, N.Y. (wollastonite), in exchange for a preferred ownership position.

Allocations and controls continue to comprise the main thread of Washington news, affecting future plans of chemical makers:

Carbon bisulfide makers met with the National Production Authority to discuss how to live with shortages. Although rayon and cellophane—both large users of the sulfur-derived chemical—are expanding, NPA and bisulfide makers agreed that allocation is not called for yet. NPA will keep an eye on the situation, may allocate later.

But carbon tetrachloride, made from carbon bisulfide, requires complete and immediate control. Total 1951 needs add up to a thumping 260 million pounds—40 million pounds more than the total supply; and customers have been informally rationed by producers. Now NPA is establishing a 20-day lead time on orders, is considering strict controls.

Phthalic anhydride makers asked NPA to divvy DO orders more equitably by establishing a percentage limit on such orders which an individual producer must fill. NPA may set a lead time on orders (probably 15 days before month of delivery) so that producers can schedule production more easily. A large increase in phthalic use is behind the current shortage: In 1949 total demand was 153 million pounds; this year it will hit 261 million; by 1953 requirements will likely come close to 350 million pounds.

If you want new equipment soon, you'd better sell your scrap now. Inventories of heavy industrial iron and steel scrap have fallen dangerously low during the past four months, falling from a normal 60 days' supply to as low as a few days'. NPA is cooperating with special local committees to get out the scrap.

More chemical production won't do much good unless it can be transported—and that's why NPA is taking immediate steps to assure tank car and freight car makers of enough steel. Steel mills, swamped with high-priority military orders, have accepted only half the car builders' July allotment orders; and without NPA intervention car building would grind to a stop by September. Car builders will get their share of plate and structural steel from August on, but July's loss can't be restored.

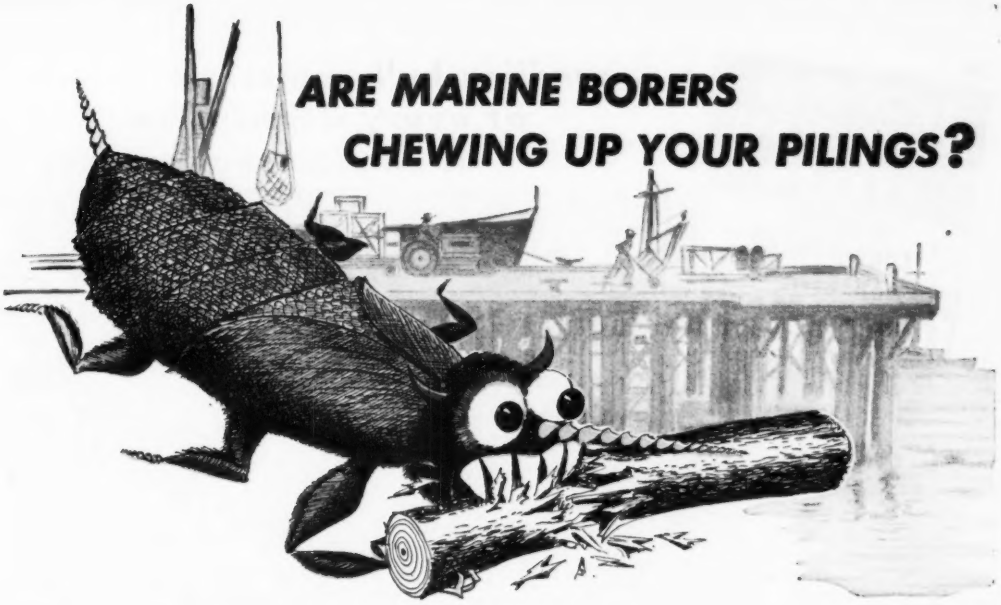
Drug manufacturers' worst fears were realized this week as "fair-traded" items became "loss leaders"; e.g., Sterling Drug's 100-tablet Bayer aspirin bottle, normally retailing at 59¢, was selling as low as 4¢ in New York City's price war. Sterling accused department stores of "jungle tactics," cut off supplies to price cutters.

Meanwhile R. H. Macy was slapped by an injunction restraining it from price-cutting ten New York-made items, but Macy said it bought them outside. The store will probably appeal.

Among new products, one reached commercialization while another was in a promising experimental stage:

Titanium Alloy's poison ivy ointment (CIW, Jan. 27) is now being made on a small scale at Niagara Falls, is sold through the New York sales office in minimum lots of twelve jars at $1 a jar.

Ottawa Chemical Co. (Toledo) is testing Ottacide, a mildew, fungus and insect preventive for vinyl sheeting and coated fabrics. If Quartermaster tests now in progress pan out, a multimillion-dollar market awaits it.



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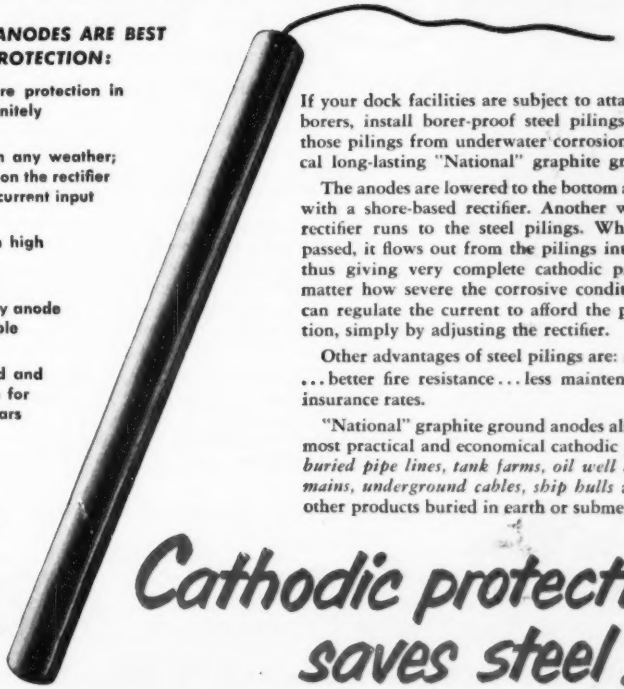

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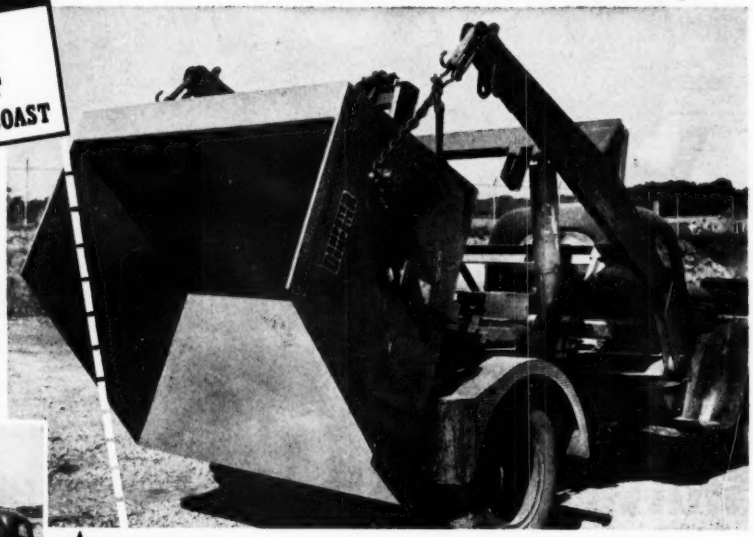

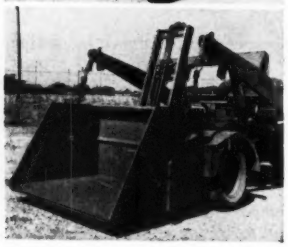

Photos show the three simple stages of servicing a container. One man, the driver, and truck-mounted Dempster-Dumpster are constantly busy, picking up, hauling, and dumping one pre-loaded container after another. Dempster-Dumpster Containers range in capacity up to 12 cu. yds.

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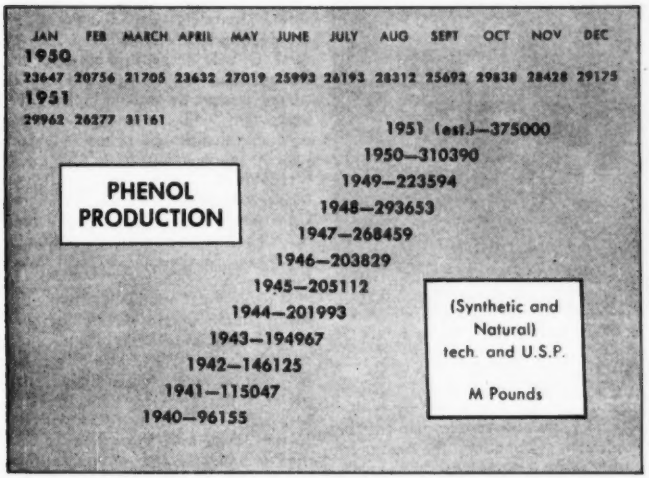


PHENOL OUTPUT: More capacity, a new process, no drain on sulfur or chlorine.

More Phenol, New Process

Increased demands for phenolic resins will boost the output of phenol by 20% in 1951-52.

Sulfur and chlorine shortages speed adoption of a new process, via cumene hydroperoxide.

Prices will tend to move upwards as phenol makers must use more and more of the costlier (50-60¢/gal.) petroleum-derived benzene.

Phenol capacity got its first big boost since 1948 in March of this year, is now scheduled for another upswing within about eighteen months. The increase this year: Bakelite's new plant at Marietta, Ohio. The unit due on stream in 1952: Barrett's $8 million facility at Philadelphia, Pa. Completion of these two plants should fatten production capacity from its present 340 million pounds per year to an estimated 410 million pounds per year.

What For?: A giant-size jump in phenolic resins output accounts for much of the current shortage and the past year's increase in phenol production. Further resin expansion is expected to take most of the coming new capacity.

Phenolic molding powders are now used principally to fill military orders. But if and when the present emergency is past, this augmented production is likely to be absorbed handily by other applications—principally as structural materials. Example: the one-piece molding which houses one of the floor-based Admiral television sets. Resin rquirements for a single molding of this type are measured in pounds (35 in this case)—not ounces.

Still another outlet is expected to call for millions of pounds of phenolic resins: bonding of foundry sands during the casting operation. This development is hailed by many foundry people as revolutionary.

Process Shift: For years a potential phenol producer eventually chose between sulfonation or chlorination to affix a hydroxyl group to the benzene ring. All plants now operating use either of these two routes. Durez's plant at N. Tonawanda, N. Y., employs a chlorination process, but it represents the first variation on this two-process theme. The difference is that the chlorination is carried out with a mixture of air and hydrogen chloride rather than the elemental chlorine. Bakelite's new plant at Marietta also uses a variant of this approach.

Barrett, long-time phenol synthesizer via sulfonation, apparently took a long look at the sulfur and chlorine shortages, plumped for the hydroperoxide process, involving use of neither scarce commodity.

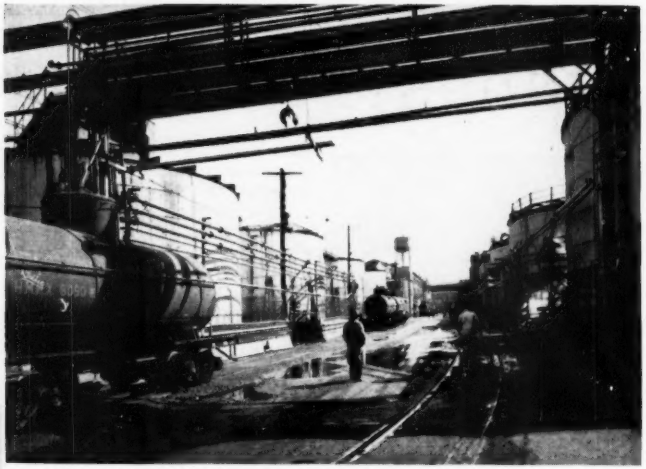
This consists of making cumene by alkylation of benzene with propylene, oxidizing the cumene with air to cumene hydroperoxide, and converting the hydroperoxide to a mixture of acetone and phenol by a disproportionation reaction. A similar process is being installed by B.A.-Shawinigan Ltd. in Canada.

Enough Benzene?: Although the benzene squeeze will undoubtedly be uncomfortably tight for some time to come, continuing imports and a growing supply from petroleum will prevent the supply situation from getting out of hand. Significant note: Barrett's new phenol plant is not far from United States Steel Corp.'s new integrated steel mill in New Jersey, where large quantities of benzene will be produced in the course of making metallurgical coke.

An important consideration in these days of benzene shortages is process efficiency on a benzene basis. The new hydroperoxide process is believed to be as efficient as either chlorination or sulfonation.

Price Trend Up: Phenol prices will probably increase in the next few years—possibly as much as three cents per pound if the cost of benzene should reach the oft-mentioned figure of 60¢ per gallon for the petroleum-derived product.

Completion late next year of the planned expansion should provide adequate supplies of phenol for some time to come. If structural uses of phenolic resins continue to come to the fore, however, more may be required. The volume of phenolic resin required for any major structural use is so huge that a critical shortage could be created overnight.



PUBLICKER SHIPPING: Fast service, reduced production staff add up to a . . .

One-Man Traffic Dividend

Officials of Publicker Industries, Inc., got more than they bargained for when they added a man to coordinate activities of sales, production, and shipping. The main reason for the move was to step up delivery service to customers. It accomplished that, also resulted in a 10% daily increase in production. And the single staff addition eliminated the necessity of three jobs in production.

The traffic liaison manager was added when it was realized that several days were consumed in routine processing of papers in Publicker's South Philadelphia plant. Under the new system, all processing is done at sales headquarters downtown and then expedited through production and shipping.

Now, if sales gets a request for five 4,500-gal. tank wagons from New York, the traffic manager doesn't wait for the order to go through channels. He immediately calls the shipping department to let it know that the trucks should leave the next day.

Publicker management points out that it is the policy of many alcohol manufacturers to maintain low inventories. They keep the stock rolling out in either 4,500-gal. tank wagons (which are becoming increasingly popular because of their convenience to small users) or in 8,000-gal. tank cars. When a rush order comes in, very often there is not enough alcohol on hand to fill it. This is eliminated at Publicker now; production is immediately informed of rush orders, has time to make up low inventories.

Under the new system, most of the confusion surrounding the manufacturing activities is avoided. As a result, production and shipments in any given day are up 10%. In addition, three jobs in production have been eliminated—thus effectively adding three men to the company's productive force by hiring one staff member.

Publicker customers receive direct benefits from installment of the new traffic manager. Increased efficiency and production make more products available. Furthermore, delivery delays have been reduced; customers can now get material when they want it.

Nichols Speaks Up

After a preliminary pilot run in the 11 Far Western states (CIW, Apr. 28), sulfur allocation is now on a nation-wide basis. This week, in order to get an up-to-the-minute picture of the sulfur order and its ramifications, Chemical Week interviewed NPA's Deputy Administrator, Thomas S. Nichols.

The new sulfur order, M-69, hits both the producer and consumer. It prohibits suppliers from shipping except under specific NPA license. It also requires consumers to submit proposed uses and present inventories. And it restricts them to 100% of their 1950 rate of consumption. Restrictions on use take effect immediately—authorizations to suppliers will begin July 1.

Officially, NPA explains its move by saying there is not enough sulfur to meet present demands. This does not come as news to either harried producers or their worried customers. Unofficially, however, there is another factor that may have influenced NPA's decision to take over sulfur rationing. The agency has been piqued at industry's own efforts to allocate; there had been charges of discrimination against small users.

M-69 will not add any sulfur to the available supply. Like other NPA orders, it is aimed at assuring essential users they will get enough and an equitable distribution of the rest. And like other orders, it raises the question: Who is an essential user? To get an answer to this and other questions, CHEMICAL WEEK interviewed Thomas S. Nichols—NPA Deputy Administrator, and Mathieson Chemical president and board chairman.

Nichols was optimistic about the sulfur situation. He points out that there is a definite limit to our sulfur requirements. "Why," he says, "if, by some miracle, the available supply of sulfur grew by 25%, industry wouldn't know what to do with it. In fact, even a 10% increase at this time would cause a shipping problem."

Sulfur consumption has skyrocketed in recent years, but Nichols thinks the increase has not been as great as many believe. Some experts have maintained that this year's 5.2 million-ton production will fall short of demands by a million tons. According to Nichols, there is little reliable data available to warrant such an assumption.

Supplier: In any event, M-69 will provide a good basis for estimating total requirements as well as a tool for

T. S. NICHOLS: Optimistic on sulfur.

assuring adequate supplies for essential users. Before the first of the month preceding the calendar quarter in which shipments are to be made, suppliers will file with NPA a form (NPAF-99) listing proposed shipments for the quarter. NPA will examine the petition, make necessary adjustments, and return it to the supplier at least 10 days before the quarter begins. The returned form constitutes the supplier's authority to ship. Suppliers should apply immediately for license to ship during the third quarter.

Consumer: Before the 28th day of each month, the consumer will report (on NPAF-98) his use of sulfur during the previous month and his inventory at the end of that month. He will also estimate his needs for the current month and his inventory at the end of it. First reports are due on June 28.

These reports, says Nichols, will enable NPA to get a detailed, accurate account of how much sulfur is needed —and where the present supply is most needed. Lack of this information was one of the main complaints against NPA's "practice" allocation in the West.

Reactions: The first move of the sulfur allocation will be to give agriculture about 10% more sulfur. (At present agricultural uses—fertilizer, dusting powder, and insecticides—account for 45% of our total sulfur consumption.)

Even so, Nichols says complaints are expected. Agriculture, for instance, may continue to be dissatisfied with its allocations. Although all complaints will be heard, agriculture will be told its interests are being protected by a U.S. Department of Agriculture man, who sits in as a member of the Interagency Criteria Committee. Recently organized, the committee will help to set policy for distribution.

British: NPA is also faced with the problem of seeing that friendly foreign nations get some sulfur to keep them producing vital defense goods. The present export schedule calls for 480,000 tons the first half of this year, 900,000 tons by the end of the year. Most of the exports will go to Great Britain.

Foreign countries are making efforts to develop domestic sources or find other suppliers. To get first-hand information on how the British are progressing with their sulfur program, Nichols recently sent a team of experts to Britain. The country has given Nichols a schedule of actions designed to reduce their sulfur demands on the U. S.

Based on this schedule, Nichols feels that the British will need only 90,000 tons in next year's third quarter, 70,000 tons during the final quarter of '52. And during the whole of 1953, they should require about 270,000—a sizable cut from the 400,000 they received from this country in 1950.

In general, Nichols says there is no cause for alarm over the supply situation. Production will eventually catch up with increased demands. The problem is strictly an immediate one with but one solution: rationing.

Boom In Sponsored Research

That's the news this week from two prominent regional research organizations. Record-shattering dollar volumes foster expanded staffs, encourage greater diversity of technical service.

Chairman Thomas W. Martin of the Southern Research Instute's board of directors reports 1950 as the biggest year in the Birmingham, Ala., outfit's existence. In addition to speaking well for SRI, the disclosure underscores the growing tendency of industry to farm out research and reduce financial outlay.

As with every enterprise that offers goods or services, the more business you do the healthier you grow. SRI is in a particularly enviable position. Fortunate in having an adequate capital fund—contributed by many companies and individuals—to provide facilities for its work, SRI pays its operating and overhead expenses out of current income from sponsored projects. Last year's unprecedented revenue should provide a comfortable margin for further development of the Institute's resources.

Fly Ash to Hatch Covers: SRI's versatility can be garnered from a look at the work it does. Important projects include: development of a new abrasion-resisting coating for coal hopper car interiors (Norfolk and Western Railway Co.); utilization of fly ash in the production of concrete of improved workability and lower heat of setting (Alabama and Georgia Power Cos.); conversion of wood waste into a molasses fermentable to ethyl alcohol; development of a new, more efficient hatch cover for cargo vessels (Waterman Steamship Corp.); design of new machinery for textile and lumber industries; cancer research; conservation of manganese in steel making (American Iron and Steel Institute); development of a highly sensitive instrument for detection and measurement of extremely low smoke concentrations (Atomic Energy Commission); basic studies in photosynthesis.

The Midwest Research Institute, Kansas City, Mo. paints an equally bright picture of the state of sponsored research. According to Charles N. Kimball, president of the organization, total dollar volume during the first six months of the fiscal year broke all previous records. To keep pace with the stepped-up activity, technical staff was increased 29%.

New staff members brought new skills, making available new fields of specialized service to accomodate an expanding clientele. A good example is the new petroleum research laboratory, specially equipped and staffed for extensive investigation in the field of high-temperature hydrocarbon gas reactions. Another important result of the expanded scope of Institute operations was the formation of a Chemical Engineering Division, to augment existing Physics, Engineering and Chemistry Divisions.

Western Boom: Stanford Research Institute, Stanford, Cal., also hit a new high in 1950. Although the first half of the year was devoted to consolidation after a period of rapid expansion, the latter half saw the makings of another full-fledged research boom. Much of this recent activity is the result of the rearmament program; revenue from government projects increased from 23% of the January total to about 45% in December. But expansion to meet federal requirements won't be at the expense of commercial service.

Stanford hopes to put in enough new facilities to handle the whole load. Many of these new facilities are needed to fill the legitimate needs of the industrial West. Loss of Oriental markets combined with an unfavorable transportation situation east of the Rockies sparked the formation of an International Division to aid in the development of new commercial outlets. Rapid growth of population and industry in the West has created additional problems. Department of Applied Biology was founded and Laboratories of Food Technology and Experimental Biology were enlarged to meet research needs in the agri-

cultural and food processing industries.

Defense research has been stepped up to the level of commercial activity. Stanford Research is now engaged in government projects—many of them classified — on engineering design, strategic planning, evaluation of weapons, potential blast damage, and many others. In line with the defense effort, the Institute is working toward the development of natural resources (oil, ores, etc.) and the improvement of processing techniques. In addition, Stanford takes on Atomic Energy Commission projects and has initiated an accelerated equipment-development program for the armed services.

Emphasis on Rarity

The American rare metals industry is making rapid strides in a field formerly dominated by the Germans. Although the growth of this field has been paced by companies like Du Pont, Titanium Alloy Mfg., and Foote Mineral, smaller outfits also account for a prominent share of the trade.

DeRewal International Rare Metals Co. of Philadelphia is a good case in point. Organized four years ago by chemist Frank J. DeRewal, the company today is encountering unprecedented demand for its rare metallic products.

Consequently, expansion is the keynote. DeRewal's situation is not unique; the entire rare metals industry is now experiencing growth pangs. Reason: technological awakening to the potential of many obscure metals on the heels of the eclipse of German activity in this field after World War II. American suppliers are now taking over a good deal of business that would formerly have gone overseas.

No Neophyte: Although his company is in its infancy, Frank DeRewal is no johnny-come-lately in rare metals. A research chemist since 1920, he has probed rare metals for such organizations as Foote Mineral Co. and Battelle Memorial Institute. A pioneer in the domestic production of hafnium oxide, DeRewal was also in on the ground floor with hafnium.

At first, DeRewal made hafnium oxide from the very rare mineral, cyrtolite. When the cyrtolite ran out, DeRewal changed his process, went over to extraction from relatively abundant zircon sands. The Brazilian government, with huge zircon sand resources, has since taken quite an interest in DeRewal's work and has invited him to head up zircon research in that country.

THE DeREWALS: A family with ideas.

DeRewal is currently installing equipment for a new self-designed process which he feels will effect another major cut in the cost of hafnium and zirconium. If hopes pan out, the new process should turn out highly pure, ductile zirconium and hafnium; titanium is also slated for similar treatment. Among DeRewal's other rare items are cesium ($800 a pound), rubidium ($1,600 a pound), and niobium salts.

Family Helps: If Frank DeRewal takes his business worries home, he is not at a loss for sympathetic companionship. His wife and chemist son are partners in the company. The DeRewals have ambitious plans for the future. A new plant is in the cards, as well as an expansion of the product roster.

Rhenium, gallium, and germanium are under scrutiny with an eye toward commercial production. But DeRewal's pet project is ductile chromium.

He won't be the first to do it, but that's not of major importance. The goal is a process capable of large-scale ductile chromium production. Chromium today is hardly a rare metal, but its brittleness severely limits its use. Ductile chromium, on the other hand, is scarce, sells for a pretty penny when available. DeRewal believes ductile chromium has a bright commercial future and he hopes to hasten it.

Styrene Stretcher

The Styrene shortage is being attacked this week by Dow Chemical Co. without aid of benzene. Plans are now moving forward for a $10,241,000 vinyl toluene (mixture of meta and para isomers) plant at Midland, Mich. Construction is scheduled to get under way this fall, and production will begin in the summer of 1952.

There has been much talk and some work on the application of vinyl toluene for a long time. But until recently the cost of benzene (and thus of styrene) had always been low enough so that there was little economic incentive to push research beyond the test-tube stage. The growing necessity of turning to costly petroleum benzene (50-60¢ gal.) to produce styrene has so rejuggled the economics that research on vinyl toluene was resumed with renewed vigor—and with success.

Its production parallels that of styrene. The aromatic hydrocarbon is alkylated with ethylene and the resultant ethyl group is dehydrogenated. Major advantage: More toluene can be produced from practically all crudes, purification is thus simpler and cheaper.

Not a Substitute: Vinyl toluene is not a complete substitute for styrene. But according to Dow, it is a satisfactory replacement for a portion of the styrene contained in such varied materials as synthetic rubber, emulsion paints, and plastics. In some

Current List of DPA-Certified Chemical Facilities

Company	Location of Facilities	Product	Amount Eligible	Percent Certified
General Atlas Carbon Co.	Pampa, Texas	Carbon black	$152,181	60
Southern Alkali Corp.	Barberton, Ohio	Silica-based pigments	11,168,000	70
Celanese Corp.	Bishop, Tex.	Trioxane and para-formaldehyde	3,485,535	65
Quaker Oats Co.	Omaha, Neb.	Furfural	3,969,826	60
Houston Oxygen Co.	Houston, Tex.	Oxygen, acetylene, medical cases	903,100	65
Union Carbide and Carbon Corp. (successor to Linde Air Products Co.)	East Chicago, Ill.	Liquid oxygen	7,964,580	55
Gulf Oil Corp.	Philadelphia, Pa.	Isobutane, butylenes, gasoline	40,596,740	65
Burdett Oxygen Co. of Cleveland, Inc.	Dayton, Ohio	Oxygen (commercial)	297,685	55
Union Carbide and Carbon Corp.	Ashtabula, Ohio	Liquid oxygen	4,168,000	65
Air Reduction Co., Inc.	Butler, Pa.	Liquid oxygen, nitrogen	5,531,252	65

cases, moreover vinyl toluene has been found to be superior to styrene, particularly in manufacture of paints and varnishes.

FOREIGN

Austria: Expansion of its only penicillin plant means that ultimately Austria will be independent of American sources of the material. Capacity of the plant (Biochemie of Kundl/Tyrol) will be increased, will be sufficient to meet domestic needs and leave a balance for export. At present the factory is turning out 90,000 ampoules a month. This amounts to about 56% of Austrian requirements; the rest is imported from the United States.

•

Mexico: A report from Mexico says that Corning Glass will shortly start construction on a $2 million glass factory in Monterey. The company has acquired an interest in the Mexican concern, Cristales Mexicanes, has established a new firm, Corning Mexicana, S. A.

•

Canada: A new pulp mill, costing between $3.5 and $5 million, will be built at Yales in Alberta. An agreement for the venture has been signed between the Alberta government and North Western Pulp and Power, Ltd.

•

Brazil: Presidential approval has set in motion a study of the feasibility of a plant for extracting sulfur from pyrites. A preliminary proposal calls for the formation of a company to which Volta Redonda would contribute half the capital, private industry the rest. Owned by the National Steelworks, the deposits are located in Santa Catarina state in southern Brazil. Estimates have placed pyrites reserves at over 500,000 metric tons.

EXPANSION

Firestone: New facilities at the company's Pottstown (Pa.) plant site will triple the company's resin production there. The facilities will consist of a one-story production unit (62′ by 140′) and a three-story office and warehouse (200′ by 140′). The new expansion will entail an expenditure of $5.5 million over and above the recent $2.5 million allotted for increasing production at the present tire and resin plant at the same site.

•

Diamond Alkali: A dust control project at the Painesville plant will cost $1 million. Plans call for elimination of fly ash from the power plant, clearing up of calcium operations, improvements in the pulverized coal department.

•

Naco Fertilizer: Opening of new headquarters in Charleston (S. C.) climaxes the company's move to the south. Reason: to move closer to the principal areas served by the company.

•

Chemstand: Construction on the new nylon plant in Florida (*CW, June 16*) will start in a few months. Located on the Escamble River, 12 mi. north of Pensacola, the plant will employ between 3,000 and 4,000 persons, will be rated at approximately 50 million lbs. of nylon a year.

•

Kay-Fries: Production of dimethyl and diethyl phthalate is expected to resume shortly. Operations had been temporarily halted by a fire on June 5. Two days later, rebuilding was started, formaldehyde production followed almost immediately. Other units—for producing fine organic intermediates—will be in operation soon after the phthalate production.

•

Kaiser Aluminum: Certificates of necessity (for expanding plants at New Orleans and Spokane) are merely the "first step" toward realization of the program, say Kaiser officials. The company has not made the final decision to go ahead.

Certificate for the New Orleans plant would enable Kaiser to double the 100,000 ton rated capacity of the plant—presently under construction. The certificate for the Mead plant in Spokane would permit the company to add 20,000 tons to the present 150,000-ton yearly capacity. Expansion of the two reduction plants will mean a $7.5 million outlay for new facilities at the Baton Rouge plant. The plant there (for processing bauxite) is currently undergoing an expansion which is aimed at boosting capacity 80%.

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National Container: A cash purchase of 97% of the outstanding stock of the Jaite Co. (Jaite, Ohio) signifies National's entry into the paper bag business. Jaite is an old-line maker of paper bags and special purpose bags. It owns and operates a kraft paper mill and a manufacturing plant for bags. On purchasing the stock, Samuel Kipnis (president of National) says present facilities will be expanded, and he hopes to substantially increase the volume of business of Jaite. Kipnis also said that the kraft paper mill would be supplied by pulp from National's existing facilities.

KEY CHANGES

Francis A. Gibbons: From secretary to treasurer, General Aniline & Film Corp.

C. Joseph Hyland: From director of public relations to secretary, General Aniline & Film Corp.

Henry C. Speel: To director of the Development Department, Wyandotte Chemicals Corp.

B. Bynum Turner: From general manager, Manufacturing Department, to vice president, Ethyl Corp.

Clinton W. Bond: From plant manager, Baton Rouge plant, to general manager, Manufacturing Department, Ethyl Corp.

Roy N. Clothier: From manager of operations, Baton Rouge plant, to plant manager, Ethyl Corp.

Wallace F. Armstrong: From superintendent, ethyl chloride manufacturing, to plant manager, Houston plant, Ethyl Corp.

Nat C. Robertson: To director of Petrochemical Research Department, National Research Corp.

James V. Donohoe: From Sales manager to vice president in charge of sales, Mixing Equipment Co.

H. I. Cramer: On leave as director of development, Sharples Chemicals, Inc., to OPS post.

Dale F. Behney: To manager of sales, Harwick Standard Chemical Co.

I. M. LeBaron: From research engineer to director of research laboratories, International Minerals and Chemical Corp.

J. V. Hightower: From West Coast regional editor, CHEMICAL WEEK, to assistant to Hilton Smith, Washington office of Ralph M. Parsons Co.

Myron T. Fleming: To vice president, Proctor & Schwartz, Inc.

Henry W. Winkler: From chief chemist to vice president in charge of research and laboratory control, Brooks Oil Co.

Joseph A. Rigby: manager of engineering and sales to vice president, engineering and sales, Brooks Oil Co.

William A. Bours III: From senior technical assistant, Technical Laboratory, Deepwater Point, to manager of the Plants Development Section, Du Pont's Organic Chemicals Department.

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Philadelphia 6, Pa., 200-204 S. Front St.	LOmbard 8-6382	Greensboro, N.C., Jefferson Standard Bldg.	Greensboro 2-2518
San Francisco 5, Cal., 917 Howard St.	SUtter 1-7307	Chattanooga 2, Tenn., James Building	Chattanooga 6-6347
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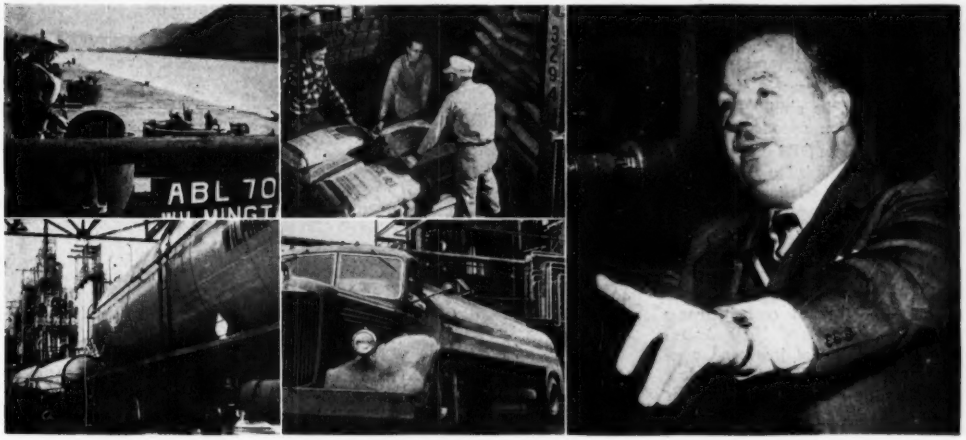


PRICE STRUCTURE of huge chemical industry comes under eyes of Mike DiSalle of OPS who orders . . .

CPR 22: Prices Via Costs

Ceiling Price Regulation 22 takes over on July 2; chemical companies frantically rush completion of mountain of paperwork to comply with order.

Chemical industry criticizes order as cumbersome, impractical; claims it overlooks role of overhead in computation of costs.

Tailor-made regulation to fit chemical industry's needs, and based upon freeze-date method, cited as most sensible approach to price regulation.

Samuel Nakasian*

Ceiling Price Regulation 22 fixes a method for the establishment of maximum selling prices for the major manufacturing industries, including most chemical producers. On its effective date, July 2, (postponed from May 28th), the new regulation replaces the General Ceiling Price Regulation issued on January 26th of this year.

Unfortunately, in the issuing of CPR 22 (April 25th), OPS neither consulted the chemical industry, nor seriously considered its special characteristics. Yet, as applied to the pricing of chemicals, there appears to be a serious question of its workability in view of the tremendous cost-price calculations involved and the many problems that arise out of the task of adjusting prices on thousands of related products. The flexibility of action necessary in the chemical industry is not permitted under the terms of CPR 22 which establishes a policy pattern on rollbacks, cost absorption and profit limitation.

Shade of OPA: CPR 22 is intended to replace the current prices under GCPR with new ceiling prices determined by adjusting pre-Korea prices by increases in factory payroll and materials costs so that some current prices may be deflated and others inflated. To achieve this purpose, OPS borrowed the OPA reconversion price regulation issued at the end of World War II to price consumer hard goods whose manufacture was then being resumed. Why OPS should select the reconversion pricing formula for the purpose of rolling back prices is not explained by the similarity of that situation with the present one.

The real answer appears to be that the OPS, in its haste to freeze margins, seized and reworked the old OPA formula and hoped that it would prove practical in application. To a certain extent, this move was understandable. Because of staff limitations, OPS has little opportunity to give serious thought to alternative methods and policies. Neither has it had the benefit of advance planning on mobilization by NSRB or any other agency.

Instead, the agency has been preoccupied with difficult organizational and staffing problems in a very tight labor market. Lacking adequate personnel, especially at commodity branch levels, the top echelon of OPS had the difficult choice of postponing action until sufficient personnel could be recruited, or of resorting to the issuance of this overall regulation.

* Washington Attorney. Former price chief of Economic Cooperation Administration. Nine years of government service also included posts with Executive Office of the President, War Food Administration and Office of Price Administrations as price specialist.

Under these circumstances, the chemical division had no opportunity to consult with the industry. The same conditions which led OPS to adopt this hazardous approach also raises the question of its ability to administer the regulation, once issued.

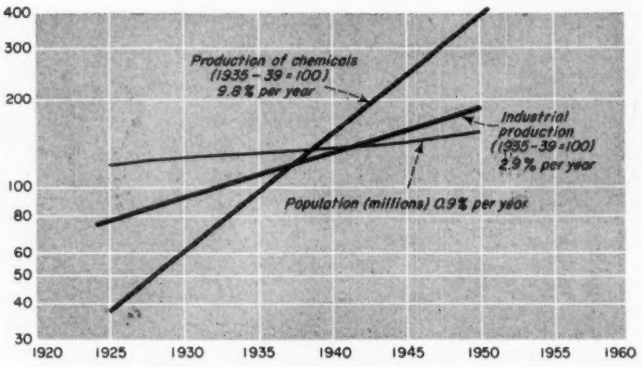
Aim—Normalcy: OPS states that the purpose of CPR 22 is "to restore more normal cost-price relationships in industry." This purpose, OPS believes, will be achieved by relieving some companies which adhered to the voluntary price freeze order of December 1950, and other companies whose prices lagged behind cost increases during the last half of 1950. As regards companies that increased margins after Korea by raising prices more than costs justified, CPR 22 is intended to roll back their prices. The net effect of this overall adjustment is considered to "constitute a major step toward restoration of equitable prices."

It may be questioned whether a normal relationship among prices is thus achieved. If the January 1951 freeze level is too high, it is at least a level at which the price relationship among the variety of products and several sellers was established by market forces. Therefore it is more normal in the economic sense than prices could ever be by adjustment which translates the cost behavior of the individual firms. If national policy dictates a lower price level, this can be achieved by freezing prices at an earlier date.

In brief, OPS has elected to exchange a price level determined by supply and demand forces for a set of prices determined on the basis of individual firm's cost behavior. In the bargain OPS expects to get some lower and some higher prices. Because of these largely unrelated upward and downward price adjustments, the chemical price structure will become snarled and unbalanced, with uneconomic pricing of products which have identical uses or may be substituted for one another. This will not be limited to finished products but will also be extended to raw materials and semi-finished materials which become costs of other competing chemical producers.

Price regulation under CPR 22 will ultimately require the imposition of a specific ceiling price for each product, which will necessitate compromising the artificial price differences created by CPR 22, but this process will not cure the vice of fixing prices on the basis of costs.

Formula: CPR 22 prescribes a formula by which the ceiling prices on each chemical product established under GCPR may be redetermined by the individual firm. The formula works as follows: The firm's current prices are rolled back to a pre-Korea base period, and then are rolled forward by a portion of manufacturing cost increases stipulated by OPS. By this formula, each manufacturer determines whether his current prices are to be rolled back completely or partially to pre-Korea base-period levels, are to be maintained, or are to be increased. While the formula thus stated is simple, its application to multi-product industries, such as the chemical industry, is a highly complicated exercise.



CHEMICAL GROWTH RATE higher than other industrials and population.

In borrowing the OPA manufacturers' reconversion pricing formula, OPS must have viewed the present pricing problem as comparable to the 1945 problem of pricing hard consumer goods, such as refrigerators, automobiles, and washing machines. Actually, there is a major difference between the two situations; namely, the problem in 1945 was one of fixing a new price and not of adjusting an existing price. For practical purposes no current price existed then, because the products had not been produced in commercial quantities during the war. Hence, the problem was to set a price which would reflect current cost conditions. This was done by the general formula of taking 1941 prices as a base and adjusting them by subsequent increases in labor and materials.

Tough on Chemicals: The CPR 22 approach is the same, but it is applied to an entirely different situation, and its consequences in the case of chemicals may be harmful. In replacing prices established by market forces with prices determined to such a large extent on the basis of a firm's costs, OPS is incurring a major risk of throwing the price structure of the entire chemical industry out of balance, both as among products and among firms. The price of each product will not longer bear an economic relationship to the prices of similar or substitute products. Moreover, the price charged for the same product by competitive firms will no longer tend to be the same, but may be quite different, because of firms' differing costs. This state of price confusion is not confined in its consequences to a management headache, but may result in a serious dislocation and curtailment of production.

It should also be noted that, except for the case cited, the government has never attempted a roll-back price by this technique. Previously, if price roll-backs were attempted, it was done by a freeze of prices prevailing at an appropriate earlier date. While such roll-backs cause inequities, they nevertheless freeze into ceilings the economic price relationship among products as well as among sellers.

Overhead Slighted: Another principal feature of the formula is that it treats the overhead costs of all industries in the same way, by ignoring their effect on net earnings. OPS hopes this policy will achieve price stabilization based on "normal" margins. Overhead cost behavior and its impact on net earnings differ by industry depending on the percentage of overhead costs to total costs, and the extent to which firms operate at capacity. An industry with a relatively low percentage of overhead costs to total costs fares well under CPR 22, because a greater part of its cost increases may be reflected in higher prices. Moreover, an industry which operated at less than capacity before

Korea, benefits directly from increased output by a reduction in overhead costs per unit which are reflected in higher net earnings.

But CPR 22 isn't so kind to the chemical industry. Whereas many industries have been able to reduce overhead costs per unit below pre-Korea levels, chemical manufacturers have generally suffered an increase. Under CPR 22, a firm which can reduce overhead unit costs through greater output in a single shift or by adding an extra shift, may improve its net earning's position despite an increase in costs of equipment and services purchased to maintain the plant.

This flexible situation does not exist generally in the chemical industry, which has operated at capacity levels before Korea. The round-the-clock "in-stream" process characteristic of chemicals production does not afford an elasticity of output comparable to that in other industries. Hence, for a firm operating at capacity levels, an increase in cost of equipment and service acquired to maintain the physical plant results in higher overhead unit costs which can not be off-set but must be absorbed out of net earnings. Moreover, in the chemical industry, the impact of such increased overhead costs per unit is serious because the chemical manufacturer has the highest percentage of overhead costs to total costs among the mass production industries.

Chemicals Different: Because of the heavy overhead cost characteristic of the chemical industry, its economic health does not largely depend upon the type of cost adjustment afforded by CPR 22. The labor cost adjustment factor affords minor relief to this industry which relies principally on equipment for its production, and relatively little on direct labor. Since replacement of this equipment is frequent, because of continuous use and corrosion, it represents a major element in overhead costs.

An appropriate margin for overhead costs is prerequisite to the growth of this industry on which the mobilization program is so dependent. During 1950, more than one billion dollars was spent for capital improvements. In 1951 capital improvements planned were almost 30% over 1950, and estimated to add 12% to existing plant capacity. The extent to which price restrictions will prevent this much-needed expansion of output is not susceptible to estimation. From a business point of view, the prospects of reduced earnings because of price restrictions will dictate caution, if not a postponement of expansion. It should be reemphasized that there is a danger that the OPS reliance on short-run principles of OPA will work against the objective of the present national program: To foster expansion sufficient to meet military needs while sustaining the civilian economy.

It may be argued that necessary expansion can be encouraged by special amortization for income tax purposes. But, while substantial tax benefits result from a reduction to five years of the normal rate of depreciation allowance, the prospect of price restrictions and profit limitations extending over a period longer than five years, may be sufficient to outweigh the temporary tax benefits, and thus stifle expansion plans.

Prices Via Costs: In the sale of standardized commodities, like most chemicals, a company's price-making decisions are influenced primarily by its selling department's appraisal of the market, rather than the controller's estimates of costs. For the most part, CPR 22 calls upon the company controller to perform the role of fixing prices on the basis of costs. Except under OPA, the controller has not undertaken this responsibility because as a practical matter, his cost computations have only an indirect bearing on price. Rather, cost-systems of bulk product industries are intended, for the most part, to serve the purpose of internal controls and of aids to management.

Abundant illustrations of this situation can be found in chemical manufacture. For example, different processes are used to make ethylene oxide. Similarly, different raw materials are put through a different process to produce acetic anhydride. But each of these items, regardless of the differing costs of materials or processes, will sell at the same price.

Undoubtedly, a firm's price based on cost build-up will vary from the price established by meeting competition of rival sellers. Firms with identical prices under the January freeze will have different ceiling prices computed under CPR 22, because the cost build-up of each firm will be influenced by a host of actors, including operating efficiency, differ-

CPR 22 *IN RE* THE CHEMICAL INDUSTRY

COMPLAINT: CPR 22 is cumbersome, impractical and inequitable in design and application with regard to the chemical industry. Its basic fault is that it establishes price ceilings on the basis of individual firms' costs rather than by the freeze-date method. By so doing it threatens to disrupt the normal economic relationship of thousands of chemical products. A serious diversion and dislocation of production may thereby result which would jeopardize the output of chemical products for defense needs.

Failure to recognize the real weight of overhead in the computation of chemical costs is another major weakness of the regulation. Unlike some other industries, the chemical industry is largely unable to absorb increased overhead costs by greater output mainly because it had little unused capacity prior to Korea. Hence, increased overhead costs, including maintenance materials, must be absorbed by a possible inordinate reduction in net earnings that might well remove the profit incentive for increased and needed expansion.

REMEDY: A tailor-made regulation for chemical manufacturers which would establish ceilings at levels prevailing on a given date. This regulation should be directed at fixing not only an appropriate price level, but the proper price relationships among products and firms.

The administration of such a regulation would require far less paperwork on the part of manufacturers and reduce the work load for OPS.

Sensible flexibility should also be a characteristic of the regulation. For instance, provision should be made for those firms whose prices on the freeze date were below the prevailing level by reason of long term contracts and other causes to adjust prices to the market level.

Price relief should also be provided to individual firms who can demonstrate a loss on a product line, without being required to demonstrate an overall operating loss.

A profit standard should also be incorporated in the regulation to preserve the profit incentive for increasing production capacity sufficient to meet both civilian and military requirements.

versification of products, by-product and joint product mix.

Price Structure: What will be the effect of practically ever firm having a different ceiling price? Under short-supply conditions, some firms may insist on their ceiling prices although higher than their competitor's prices. However, it is more likely to be the practice of principal manufacturers to sell below their ceilings in order to meet the price of rivals, rather than destroy their reputation for being competitive. Therefore, the general market price may tend to be at the ceiling level of the lowest principal seller.

Ceilings fixed at varying levels for the same product will confuse rather than improve the ceiling price structure. Either OPS will have to raise the low ceilings or to roll back the high ceilings or to tolerate a range of ceiling prices with such modifying effect as may result from market forces, such as high ceiling firms selling at the level of the low ceiling firms. In the case of some commodities, a double roll-back will thus result from the impact of both CPR 22 and market forces.

OPS has already given notice that CPR 22 is an interim action to be followed by tailor-made orders for certain industries. Such orders have been issued for machinery, shoes and textiles, but they employ the same basic principles as CPR 22. OPS has also given notice that subsequent orders shall be issued to iron out the price ceiling maladjustments resulting from the CPR 22 formula; however, the fundamental fallacy of fixing prices on the basis of costs will not be corrected, but preserved.

Under conditions of adequate or long supply, ceiling prices serve no anti-inflation purpose, and, actually may tend to keep prices at higher levels by becoming selling targets for the industry. This is a problem yet to be solved.

Then and Now: In World War II, the all-out military effort made necessary a maximum curtailment of civilian production to enable the conversion of existing plants to war. New plant construction was limited to purposes of supplying the armed forces. So great a proportion of the available working population was called into active military service that manpower became critically short. While the need for installing labor-saving machinery was never greater, the supply of such equipment was severely limited because of the demand for end-use military items.

Today, however, given the price incentive, there is substantial production of capital goods to replace labor and to increase production. The overall statistics show that World War II required approximately 25% of American manpower for military service and 45% of total industrial output, as compared with the defense program in 1951-1952, which will take an anticipated 5% of available manpower for military service and 20% of total output.

Dislocation: Some manufacturers will be faced with the fact that some items are no longer profitable to make under the ceiling prices fixed by CPR 22. The discontinuance of such items by a manufacturer means giving up the market to a competitor who has been able on the basis of his cost records to compute a higher ceiling price, or to a firm with greater resources with which to undertake production at a loss. This shift of production is not only an inequity, but a serious dislocation, which in compounded form, may have adverse consequences in the defense program.

These inequities and dislocations are not short-run considerations limited to the defense program. The flexible firms are invariably the large multi-plant or integrated companies. If these inequities and dislocations are preserved for any considerable period of time, the small firms face the likely prospect of being forced out of business.

Hardship Policy: An individual firm may be given price relief on a product or product line if total operations of a plant are at an overall loss, if the loss results from low ceilings required by CPR 22, and if the price increase requested would not exceed prices established for other sellers by CPR 22. This provision is far more stringent than the individual product adjustment standards under OPA regulations.

The industry profit standard of 85% of base-period net earnings before income taxes, imposes a limitation upon any industry-wide price increase. How this profit standard will be computed has yet to be announced, but it is likely to be patterned after OPA's method. It should be clear that this standard affords no basis for price relief to the individual firm whose profits have sagged below the industry profit average.

Chemical Difficulty: Because of its multitude of end products, great number of raw materials, complicated blending of compounds, and varying processes of manufacture, the chemical industry is seriously handicapped in complying with CPR 22. The obstacles are not merely physical volume, but problems of qualitative cost evaluation for pricing purposes.

Substantial firms produce well over 500 end products with semi-finished products and raw materials running into hundreds. Larger firms may produce as many as 5000 finished items, and also produce intermediate products in large quantities. A finished product may be manufactured from different materials by different processes, each involving substantially different costs.

The computation of raw materials costs is complicated by different methods of delivery; rail, water, truck, or pipe-line. Raw materials may arrive in different form, such as phthalic anhydride in flake or molten form, or in various stages of processing, for example: calcium carbide as such or as acetylene. In the manufacture of olefins, raw materials must be segregated because of the variety of materials used which are substitutes, and because of the great number of suppliers. Unless this segregation is made, costs may not be adequately reflected.

A segregation of raw materials is also required because some items are OPS controlled and others are free; some have a December 30, 1950 cut-off date, others March 15, 1951. For example, synthetic industrial alcohol is subject to control, while fermentation alcohol is not controlled, despite the fact that they serve the same purposes. Firms using both types of alcohol will be required to sub-divide this product for costing purposes in order to reflect accurately the cost difference.

Long-Term Contracts: Materials purchased under long-term contracts at prices fixed below current market levels raise another complication. The dual price of materials should be reflected and weighted by volume in order that the full measure of the cost increase may be allowed in the end product price adjustment.

Finally, the same material may be both imported and produced domestically. It will be necessary in such cases to differentiate by source for the reason that, lacking offective control on import prices, domestic sources will be cheaper, and another type of dual price structure results. The cost picture is further complicated by the fact that some portion of materials may be manufactured and the balance purchased. It is necessary, therefore, to separate the purchased part.

COMPLIANCE

It is apparent from a general review of the application of CPR 22 to the chemical industry, that compliance does not entail merely a clerical function but a complex process of adaptation. If it were a clerical function, the standards of compliance could be stated objectively. Or, if OPS were issuing its rules against a uniform system of accounts such as that prescribed by the ICC for interstate carriers, it would be possible for more precise measurement of compliance.

Decisions Needed: In the performance of this assignment, the firm's staff can not avoid making critical decisions on such details as definitions, classification of cost data, grouping or differentiating products, and moreover, estimating and extending figures where the detail is so great as to make impractical a literal compliance with the rules. However, such decisions should be reasonable and have a factual basis to support them. Within such a framework, the firm may then proceed to apply the rules to its records in a manner appropriate to achieve compliance with the regulation.

Standard Costs: In the product method and product-line method, a firm may have readily available standard costs. The use of these standards is not specifically authorized by CPR 22 as a measure of costs, but they are essential as the basis for determining costs because they contain the basic information as to labor and material consumed in the manufacture of a product. By adjustment to reflect current costs, the standard costs systems are appropriate. If a firm adjusts standard costs on a monthly or quarterly basis of performance, then these standards should be an appropriate measure of costs.

Analysis First: A firm should attempt to analyze its cost-price relationship before applying the formula. The primary decision in a rational application of the formula is selecting the most favorable base period. Because of the inter-relation of material and labor costs with base-period prices, the principles underlying the behavior of these elements should be understood in the selection of a base-period in arriving at the highest ceilings.

Although drafted largely in terms of total costs and revenue, the regulation is best understood in terms of unit prices and average unit costs. For instance, factory payroll for the fiscal year may be expressed as average unit labor costs by dividing the payroll by the number of units produced. In the same manner, unit material costs may be computed and net sales may be expressed as average price. In general, a base period should be chosen in which the following conditions are present: The highest selling price, the lowest unit labor cost, and the lowest unit material cost. Under the formula, this combination will yield the highest ceilings. However, average costs and selling prices in the base year[1] may affect the amount of price adjustment.

In the discussion which follows, when the terms *material cost increase* or *labor cost increase* are used, they mean the increase in unit material or labor costs from the end of the base period selected to the post-Korea date prescribed in the regulation.

Where the Aggregate Method for materials is used, ceilings are computed by increasing the base-period price by a percentage factor equal to the sum of the material cost increase and the labor cost increase (adjusted by the ratio of base year to base period labor costs) expressed as a percentage of average selling prices for the base year.[2] This means that instead of the new ceiling price reflecting actual cost increases, it will reflect these increases adjusted by their relationship to average selling prices for the base year. For example:

Assume the selling price for the base period selected was 5 cents per pound and that the average selling price for the base year was 4 cents per pound. There was no labor cost increase but material costs increased ½ cent per pound. The ceiling price would be:

$$\$ .05 + \frac{\$ .05}{\$ .04} \times (\$ .005) = \$ .05625$$

In other words, a firm would receive a cost increase of 25% more than its actual cost increase of .005 per pound because its base period selling price was 25% higher than the average selling price for the base year.

[1] The last fiscal year ended not later than December 31, 1950 is the prescribed base year under the regulation.

[2] $P^c = P \left[1 + \frac{\Delta M + \Delta L(L'/L)}{P'} \right]$

where:	Price	Labor Cost	Mat'l Cost
Base Period	P	L	
Base Year	P'	L'	
Increase		Δ L	Δ M
CPR 22 Ceiling	P^c		

The converse of this situation exists when the base period selling price is below the average selling price for the base year. Under this condition, the actual material cost increase would be reduced proportionately to the ratio of base period to average base year selling prices. For instance, assume in the above example that base period and base year prices were reversed:

$$\$ .04 \times \frac{\$ .04}{\$ .05} (\$ .005) = \$ .044$$

When the cost-price relationships dictate the selection of a base period where this situation would be present, the depressing effect of the average selling price in the base year may be avoided by selection of one of the three alternative methods for material cost adjustment.

Where either of Methods 2, 3, or 4 for materials is used, ceilings are computed by increasing the base period price by the amount of the actual material cost increases[3] and by a percentage factor equal to the labor cost increase (adjusted by the ratio of base year to base period labor costs) expressed as a percentage of average selling prices for the base year. As in the previous example where labor costs remained constant:

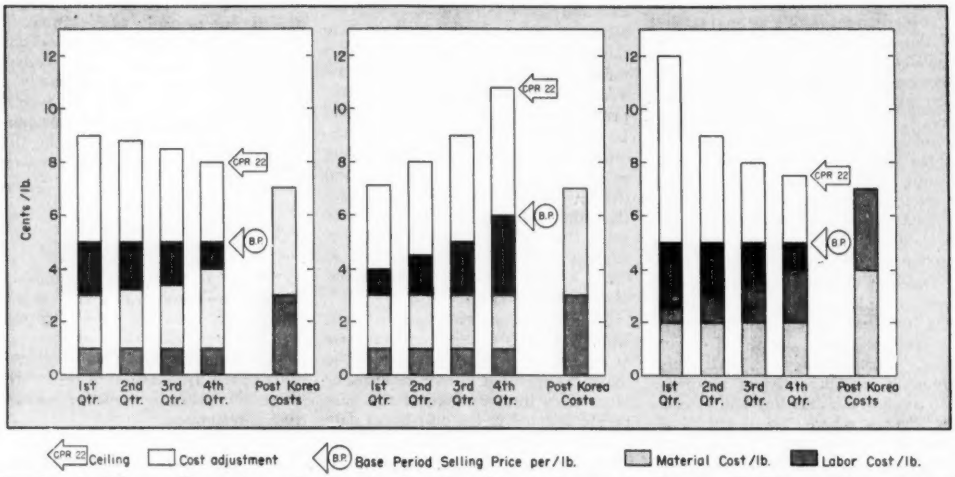
$$\$ .04 + \$ .005 = \$ .045$$

While the base year price and labor cost influence the labor cost adjustment, this example omits the problem of labor cost because only one method is prescribed for this adjustment.

Three Factors: These formulas are helpful in indicating the factors which should be considered in selecting the base period. First, the highest base-period selling price will tend to yield the highest CPR 22 ceiling price. It will not only provide the largest base figure to which cost additions are made; but it is likely to be above the average selling price for the base year, thus increasing the cost addition as illustrated above. Second, since material prices and labor rates at the prescribed post-Korea dates are factors which are independent of the base period selected, the lowest base period material and labor costs will produce the largest cost adjustment. Third, if a base period can be selected with the lowest labor cost, the labor cost adjustment will be enlarged by the ratio between the lower

[3] $P^c = P \left[1 + \frac{\Delta L(L'/L)}{P'} \right] + \Delta M$

BASE PERIOD CHOICE BIG FACTOR IN CPR 22 PRICE ADJUSTMENT



Situation A: Where selling price and labor costs are unchanged in all base periods, the base period should be selected in which material costs are lowest. Given the above cost-price relationship, the base period to base year ratios of price and labor costs do not affect cost adjustments; therefore, the cost adjustment is the sum of actual material and labor cost increases. In this case, any one of the four methods for materials cost adjustment will yield the same ceiling.

Situation B: Where labor and material costs are unchanged during the four base periods, the base period should be selected in which the selling price is highest. Because selling prices changed in the four base periods, the base period to base year ratio of price influences the amount of cost adjustment. Note that fourth quarter cost adjustment is 4.8¢@ although actual cost increase is only 4¢ per pound. In this case Aggregate Method will yield higher ceilings than Product or Product-Line Methods.

Situation C: Where selling price and material cost are unchanged during the four base periods, the base period should be selected in which the labor cost is lowest. Material cost adjustment will not be affected by the base period to base year ratio of price; therefore, this cost adjustment is the actual cost increase, and any one of the four methods may be used. Because of the labor cost change, the effect of the base year to base period labor ratio influences the amount of labor cost adjustment.

labor costs in the base year and the higher labor costs in the base period.

The behavior of prices and costs after June 24, 1950 does not influence the selection of a base period. However, the selection of the base period has a great influence on the amount of price adjustment for post-Korea labor and material cost increases.

Four Methods: On the basis of the foregoing principles, a firm should endeavor to determine which of the four methods should be employed for materials cost adjustments. And to repeat, the problem of choice does not exist in computing labor cost adjustment because whether figured on a plant or smaller unit, the basis of the computation is the same. In the case of a multi-product plant, a rational choice of the methods for materials cost adjustments, for which the basis of computation differs, will depend on the price-mix, product-mix, and cost-mix.

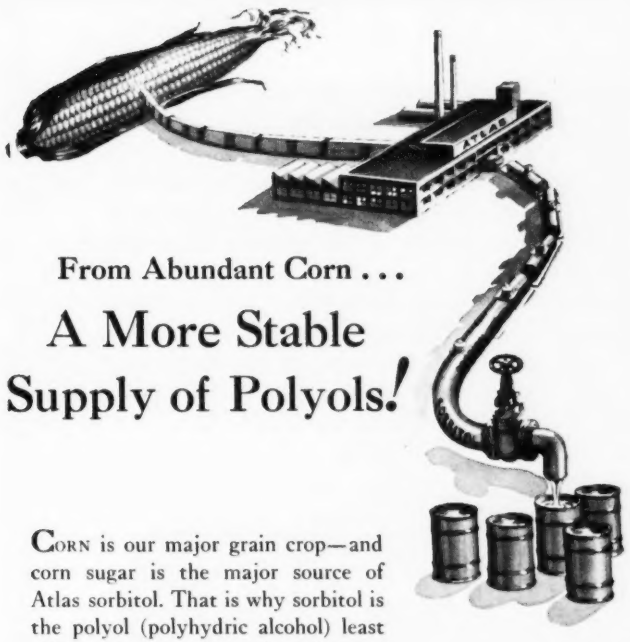
These terms should be given specific meanings when applied to a company. Price-mix means the firm's price structure as consisting of prices on each product and the relationship among them. Product-mix means the composition of the firm's sales catalogue and the quantities of each product produced. Cost-mix means the firm's material and labor costs and the quantities of each consumed.

This analysis will permit an appraisal of the composition of average price and materials costs. If the components are disproportionately weighted in the average, consideration should be given to the fact that in the Aggregate Method, all product prices are adjusted by a uniform percentage. While in some cases this result may be desirable, in other cases it may afford inadequate price adjustment on some products to compensate for increased materials costs. Under Material Cost Adjustments methods 2, 3, and 4, product or product lines may be given more favorable treatment. Where records permit, it may be possible to use the product method for some items and the aggregate method for the balance of the plant.

The illustrations given in this report are oversimplified by the assumption that two of the three elements are constant. In actual situations, each of the three elements will vary during the four base periods, and each element is likely to vary at different rates. In such cases, a more complex analysis will be required, but based on the principles illustrated.

Uncertainty: CPR 22 provides that, if a firm establishes a ceiling price above the January freeze level, the firm must postpone charging that price until fifteen days after date of filing. This period is intended to give OPS the opportunity to question and review the increase before it becomes effective. In the absence of OPS objection the firm may charge the new ceiling price. But silence on the part of OPS during this period does not denote that the price has been approved. It may subsequently be struck down . . . . when OPS gets around to reviewing the particular case.

Operationally speaking, this situation is perhaps the severest disadvantage that CPR 22 will bring in its wake. Because of the delays in the reviewing of forms, a cloud of uncertainty will hang over most chemical prices. Managements will have to wonder, yet work under the shadow of the question: Will OPS uphold our price computations?



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PROPERTIES:	DIETHYL MALEATE
Formula:	$(:CHCO_2C_2H_5)_2$
Molecular weight (calc):	172.18
Density, g/ml, at 25°C:	1.0637
Weight per U. S. gal. at 25°C:	8.88
Coefficient of Expansion,	
20°C to 30°C, per 1°C:	0.00094
per 1°F:	0.00052
Refractive Index, n_D at 25°C:	1.4383
Boiling Point, °C at	
760 mm of mercury:	225.3
200 mm of mercury:	177.7
10 mm of mercury:	99.4
Heat of Vaporization, kcal/mole:	12.5
Melting Point, °C:	-11.5 (approx.)
Viscosity, centipoises, at 25°C:	3.14
Flash Point, Cleveland Open Cup:	250°F
Surface Tension, dynes/cm, at 25°C:	36.7
Solubility,	
Ml H_2O in 100 ml product:	2.1
Ml product in 100 ml H_2O:	1.3

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INOSITOL RAW MATERIAL: A different one may cut the price.

Corn Chemical Catches On

Major boost in inositol production crowns recent biochemical research discoveries.

Drug uses take nearly all of today's inositol, but the chemical could find a place in the process industries . . .

If present high price takes a substantial come-down.

Inositol (cyclohexanehexol), first isolated over a century ago, now appears to be well on its way as a chemical of commerce. Proof enough is A. E. Staley Mfg. Co.'s ten-fold boost in productive capacity. But it seems that even this healthy increase isn't enough to satisfy Staley's eager customers. Swamped with orders as soon as the word got about, Staley has already sold its first year's expanded output. Corn Products Refining Co. is in much the same boat; demand is well above production.

Inositol owes its new-found popularity to its biological activity—specifically, its lipotropic action. Tied up in some way with fat metabolism, the compound has the power of reducing excessive amounts of fat in body tissues. This property has of late created quite a stir in medicine. Reduction of fatty deposits in the liver, by the administration of inositol, has given good results in the treatment of liver cirrhosis. Experiments are now under way to determine the material's value in combating arteriosclerosis, coronary heart disease, and disturbances caused by abnormal fat deposits in the liver.

A member of the vitamin B complex, inositol is a white crystalline, cyclic sugar. Since its discovery in 1850, a number of geometrical isomers have been characterized; the prefix "meso" was hooked on as a distinguishing label. But today, this tag has gone by the boards as only the one isomer is available commercially.

Both animal and plant tissues are good sources of inositol. Seeds and cereal grains are about the richest plant source, containing the substance in the form of its hexaphosphate ester (phytic acid). Animal inositol is generally found as a partially esterified phosphate ester; brain, stomach, kidney, and heart muscle are especially rich in this substance. The compound has also been isolated from microorganisms.

Puzzle: Because of widespread occurrence in common foods and the possibility that the body can synthesize its own, inositol is still somewhat of a nutritional puzzle. To date, no one has conclusively proved it to be an essential factor in human nutrition. However, inositol deficiency in rats and mice is definitely associated wth poor growth and loss of

SULPHUR

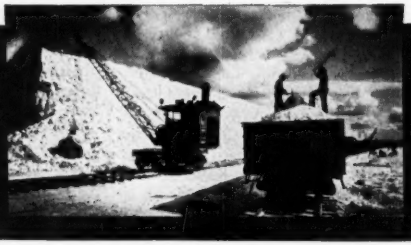
*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*MOLTEN SULPHUR

The discharge lines from the wells deliver the sulphur into sumps at collecting stations which are located near the area being "steamed."

The sump is dimensioned to suit operating conditions, as well as the number of wells supplying sulphur. Cast iron has been found the most suitable material for lining the sump, and for the steam coils on the bottom and at the sides which keep the sulphur in a liquid state. When the sump is reasonably full, pumps force the liquid sulphur through insulated pipe lines to the vats. The pumps are especially designed for this service, the moving parts being either submerged in liquid sulphur or steam-jacketed.

Loading operations at our Newgulf, Texas mine



TEXAS GULF SULPHUR CO. INC.

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Mines: Newgulf and Moss Bluff, Texas

hair. Probable human daily inositol requirement has been estimated at about one gram.

Corn steep liquor is the raw material for commercial inositol production. Crude sweepwater is evaporated down to about 50% solids; the contained inositol hexaphosphate reacts with lime to give a precipitate of calcium phytate. Phytate may be refined and sold, or hydrolyzed to the free inositol.

Inositol manufacture in this country goes back about eight years. Staley had a small pilot plant in 1943, and Corn Products recalls sales dating back five years or more. Since its introduction, the price of inositol has fallen from $36 a pound to its present $5 level.

Although the great bulk of inositol today goes into pharmaceutical preparations, the substance has stirred the imagination of industrial researchers. Patents have been issued for applications in the synthesis of explosives, synthetic resins, and surface coatings. Two workers at Mellon Institute have come up with a potentially valuable use (for inositol esters of linseed fatty acids) in the preparation of drying oils.

New Process Needed: But inositol's high price squelches immediate hopes for a place in commercial manufacture. And further cost reduction will be just wishful thinking until inositol production can be divorced from steepwater extraction. Price has just about hit bottom for the small yields obtained by the extraction process.

Despite this discouraging situation, the future holds some promise. A synthetic inositol, from an abundant starting material, would go a long way toward changing the entire picture. Efforts have been made to convert dextrose to inositol, but results—while not completely negative—weren't too successful. However research is continuing.

In the meantime, producers are quickening their efforts to boost output by the existing method. Corn Products Refining Co.'s present plans are concentrated on banishing process bottlenecks to hasten delivery dates for a growing line of customers.

•

New Reagent: N-bromomethylphthalimide, a product of Dajac Laboratories, offers advantages over the more common reagents for derivatizing alcohols and phenols. Reaction is rapid and derivatives are usually easily separated and purified. Solid derivatives may be obtained even with low molecular weight alcohols; chance formation of undesirable side-products is minimized. Reagent is stable, easily stored. Table of phthalimidomethylene ethers is also available.

•

Corrosion Probe: A new Armour Research Foundation laboratory will concentrate on cheaper ways to combat corrosion. Special equipment to simulate all conceivable weather conditions, will play a leading role in the development of improved corrosion-inhibitors. Foundation's Edward Schwoegler will head up the program aimed at reducing the nation's $5.5 billion annual corrosion bill.

•

Phenolic Setter: EDF crystals, condensation product of ethylene diamine and formaldehyde, are now available from Clopay Corp. Product is useful as a high-speed setting agent for phenolic resins and should be of additional interest in rubber manufacture.

•

Research Grants: Research Corp. will make approximately $800,000 available for research grants during the current fiscal year. About $200,000 will go toward nutritional research; the remainder will finance grants in physics, chemistry, mathematics and engineering.

•

New Amines: Carbide and Carbon Chemicals Co. is now offering commercial quantities of alpha-methylbenzylamine, alpha-methylbenzyl monoethanolamine, and alpha-methylbenzyl diethanolamine. The compounds are aryl-substituted alkylamines, but in many respects closely resemble lower alkylamines; increased oil-solubility is a striking exception. Suggested use: intermediates in the preparation of new surface active agents.

•

Research Chemical: Alpha chloroacetamide, a white crystalline water and alcohol soluble material, can be had from Chemical Development Corp. Potential uses are still obscure, but possibilities include resin catalyst, photo antifog agent, and organic synthesis.

•

New Alloy: Tin-nickel alloy, developed at England's Tin Research Institute, is boosted as a rival to chromium. A faint rose color, the alloy is formed by the simultaneous electrodeposition of two parts of tin to one of nickel. Markets: Protective and decorative finish for automobile accessories, cutlery, bathroom fittings, door handles, cigarette lighters, etc.

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RESEARCH . . . . . .

Stain Remover: A series of patents issued to Best Foods describe fabric color and stain removers consisting of zinc sulfoxylate formaldehyde, succinic acid, and p-diisobutylphenoxy ethoxyethyldimethylbenzyl ammonium chloride. Succinic acid may be replaced by oxalic acid, monosodium, and monocalcium orthophosphate.

•

Cyanuric Boost: American Cyanamid Co. has stepped up production of cyanuric chloride by the addition of a second manufacturing unit at its Warners, N.J., plant. Dyestuff producers may find the chemical a good replacement for coal tar intermediates (i.e. resorcinol) now short.

•

Zirconium Analysis: Indian researchers report a new aid to zirconium analysis. Hydrazine sulfate completely precipitates zirconium in solution of pH 2.8 to 3. Discovery is of value in separating zirconium from thorium, beryllium, nickel, and rare earths.

•

Citric Boon: According to the USDA's Northern Regional Research Laboratory, methanol in 1 to 3% concentration (by volume) inhibits sporulation and markedly increases the yield of citric acid. Tolerance level of zinc, iron and manganese in the medium is increased by the presence of the alcohol. Commercial glucose, starch, beet and blackstrap molasses can be fermented, without special purification, in submerged culture. Yields, based on sugar consumption, are over 63%.

•

Bio-Glycerol: Canadian National Research Council reports that certain strains of Bacillus subtilis produce equal amounts of glycerol and 2,3-butanediol from a glucose substrate. Yields from starch were somewhat lower than from glucose.

•

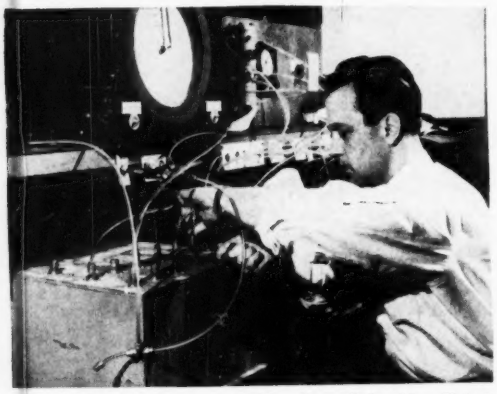
Growth Promoter: Schwarz Laboratories has added cytidine sulfate to its line of nucleosides available to biochemical researchers. Important in studies of biochemical reactions and metabolic functions, cytidine has a definite growth promoting effect on several organisms.

•

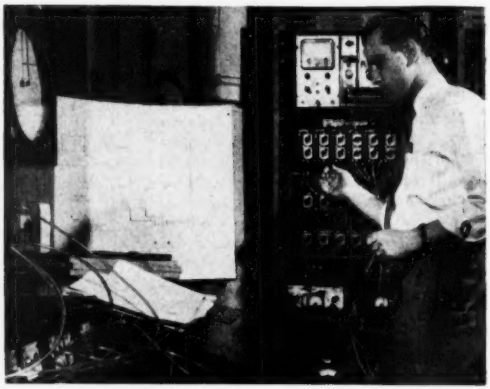
Natural Gas News: Research laboratories and pilot plants may now obtain Texas natural gas in cylinders from Matheson Co., Inc. Gas contains approximately 93% methane and has a heating value of 1036 BTU per cubic foot. Packaged natural gas should be welcomed by plant owners contemplating a switch from manufactured gas.

1 A FIRST QUESTION after deciding to build a new plant: What types of instruments and where will they be located?

2 AS EXPLAINED by Brown engineer, Vern Miller (left), analogs will speed choice of instrumentation.



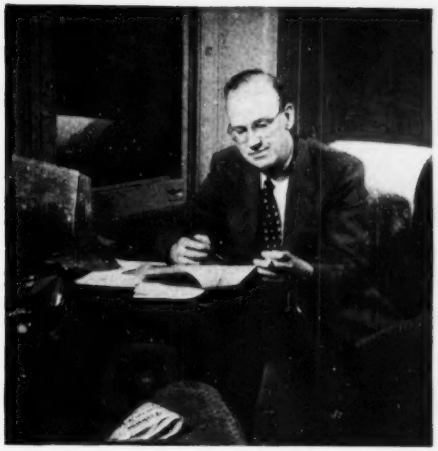
5 AT TIMES the simpler fluid analog will furnish sufficient data. Here Higgins is making a flow test.



6 MORE OFTEN an electrical system is called upon. A hookup simulating actual process operation is made.

7 AFTER ANALYSIS of the studies the processor (visitor's button in lapel) is given outline of instrument needs.

8 PLUS FACTOR: In many cases confirming data on best pipe sizes, valve locations, etc., can also be obtained.



3 WITH THE GO-AHEAD signal, Miller returns to headquarters loaded with data for further study.

4 AFTER REACHING HOME Miller outlines the problem—controls for a new chemical plant—to Steve Higgins, the analog operator.

PRODUCTION . . . . . .

How Analogs Speed Process Instrumentation

A major problem faced by builders of the many new plants now under way for the chemical industry is to determine the types and locations of the required process control instruments.

Engineers of Minneapolis-Honeywell Regulator Co.'s Brown Instruments Div. are saving time and money in determining what control system is required in a plant modernization or expansion program. This is accomplished by use of analogs—scale models whose performance is analogous to that of the process to be controlled.

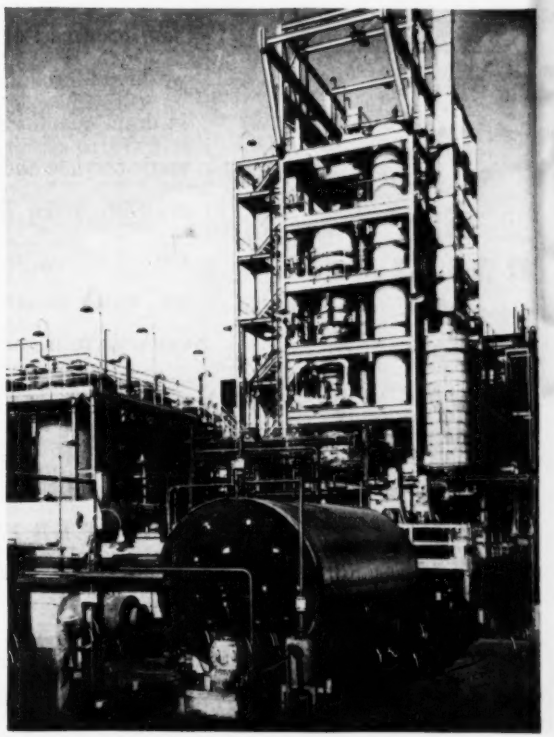
Analog analysis is of particular value where extremely stringent requirements are placed on the operation of the process and where rapid testing is a must.

Two types are used: the rather obvious fluid flow analog, and the more recently developed electrical type, the potentialities of which are only beginning to be realized.

In an electrical analog of a heat transfer system, measurement of voltage replaces temperature measurement; while flow of electrical current represents heat flow. The ability of a system to store heat is represented by a condenser; resistance to heat transfer by resistance to the flow of electrical current.

All Electric: Thus to study any process is simply to take the proper electrical elements and connect them in the proper sequence. With such a setup tests which could ordinarily require weeks of experimentation in costly pilot plant equipment can be compressed into a period of days, and the instrumentation required to keep the process under control at all times is readily determined.

By this means a rational basis is provided for evaluating cost and relative performance of proposed types of instrumentation. Means of process control can then be installed during construction as an integral part of the plant.



9 THE PRODUCT: A plant which is a product in part of analog study —Rohm and Haas' new unit for acrylic monomer production.

Poured Packing, Lower-Cost Oxygen

The Linde-Fränkl cycle for the production of liquid oxygen drew the attention of production men this week. Reason: The recent news that it will be used in the now-building liquid fuels plant (M. W. Kellogg Co., general contractor) of the South African Coal, Oil and Gas Corp. at Coalbrook in the Orange Free State.

The new plant will utilize six 290-ton-a-day Linde-Fränkl oxygen plants for the preparation of synthesis gas from coal. Installation of the units will be done by Gesellschaft for Linde's Eismaschinen A.G. who installed the first tonnage oxygen plants to use the regenerative principle.

Key, Regeneration: In the U.S., Linde-Fränkl plants are installed by the Chemical Plants Division of the Blaw-Knox Construction Co. The use of packed regenerators rather than metal heat exchangers provides a major point of difference between the Linde-Fränkl and the other cycles used in this country.

A possible exception to this observation is the unit constructed by the Linde Air Products Division of Union Carbide and Carbon. Prior to World War II there was a working agreement between the German Linde and the American Linde companies. And when the war was over, the American company had the opportunity along with other investigators of examining all tonnage oxygen plants erected in Germany before 1945.

In regenerative operation, the incoming air is cooled almost to the liquefaction temperature by the previously cooled poured packing. Cooling is provided by contacting the packing with the cold oxygen and nitrogen exit streams. Over-heating is prevented by reversing the direction of flow periodically.

In the Linde-Fränkl cycle the air is compressed to 65 psi prior to its passage through the regenerative heat exchangers. Blaw-Knox engineers also state that the fifteen minute reversing cycle attained by their cycle is much longer than that previously attained by any other system. Reason: Higher heat capacity of the larger quantity of packing permits more gas to be cooled before it is necessary to turn the reversing valve. Further advantage: use of packed regenerators when cooling the incoming air enables the warm end temperature approach to be much closer than in standard types. This closer approach results in a great saving in power.

Dewatering: Cleaning of water and carbon dioxide from the inlet air stream is a most important problem in any liquefaction-distillation plant for oxygen production. Without their removal the mechanism would soon clog up with ice and solid carbon dioxide. This cleanup provides one of the main advantages of the regenerative system. The ice and solid carbon dioxide are frozen out on the surface of the packing as the incoming air is cooled. They then return to the exit gas streams which are warmed by the packing which in turn has been warmed by incoming air.

Heat exchangers with poured packing, used in the Linde-Fränkl system, are believed to provide lower cost operation than the metal reversing exchangers used by other processes. The poured type costs much less per unit of heat transfer surface, allowing more surface to be employed. But a 15-minute heat transfer cycle requires more cold storage and an increased "cold box" size. The "cold box" is the insulated section of the unit containing all of the cold equipment.

Two Sections: The Linde-Fränkl column is divided into two parts. The nitrogen condenser for the lower part of the column serves as the heater to vaporize liquid oxygen in the top column. Liquid nitrogen serves as the reflux in both columns. Air cooled nearly to the temperature of liquefaction enters the bottom tower and oxygen-enriched liquid from the bottom of this tower passes over an adsorbent to remove the last traces of the acetylene before it can collect in the oxygen (top) tower.

The purified oxygen (usually 95%) passes off the bottom of the top tower and thru the oxygen regenerator to use. The Linde-Fränkl system, however, is quite flexible. Oxygen of almost any purity desired can be produced between the ranges of 70% and 98%. Also 50% of the nitrogen stream can be removed with a purity of 99.5% with little change in the plant design. Routinely purities of 98% or better are obtained.

It is difficult to make definite statements concerning costs but, using the cost analysis procedure proposed by the American Gas Association, Blaw-Knox estimates that the plant investment will vary from $306,000 to $2,600,000 for plants of 25 tons per day and 500 tons per day. Operating at 100% of capacity the cost of producing oxygen ranges from $8.45 per ton for a 25 ton-a-day unit to $3.30 per ton in a 500 ton-a-day plant.

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TEST CAGE: Bites for Rutgers' Granett, repellents for the public.

Insect Repellent Quest

New compounds of potential value as insect repellents are being uncovered in USDA's screening program.

Because research-to-retail counter trail is long, products for current selling season are formulations proved in World War II and since improved for civilian use.

But at least one aerosol insect repellent is on the market; and other manufacturers are quietly experimenting with suntan-repellent mixtures for pressure packaging.

Sales of insect repellents start picking up in the spring as the outdoor-loving, insect-hating public turns to chemical manufacturers for protection against bites of mosquitoes, flies, mites, chiggers, gnats, etc. But as far as repellents are concerned, it is always spring at the Orlando, Fla., laboratory of the USDA's Bureau of Entomology and Plant Quarantine where researchers every year test hundreds of chemicals for potential value in such applications.

There is an excellent market for insect repellents, and there are available compounds effective for a fair range of biting and nuisance insects for one to 12 hours. Effectiveness depends on the individual user, temperature and moisture. Most repellents, however, are objectionable in that they are solvents for paints, plastics, rayon and the like, and impart a sticky feeling to the skin.

In an exclusive interview this week, E. F. Knipling, top Agriculture Department man in this field, told CHEMICAL WEEK that repellents superior to those on the market have come out of the USDA program, and been approved for potential military use, but that they are not commercially available as yet. One of these, containing propyl N,N-diethyl succinnamate, is particularly effective against sub-arctic insect pests, and it combines well in mixtures with other current repellents.

Rough Road: Although this screening and testing program promises extra protection for our military men in insect-infested areas, approval of such materials in formulations for civilian use must await extensive toxicological and dermatological data. This procedore necessarily is a prolonged one. Moreover, one compound may possess superior repellent characteristics against some insects, fair repellency against a few others, and almost none against many others. If a chemical doesn't exhibit wide enough effectiveness or compatibility with other repellents to enable it to impart its properties to formulations, it will be of limited interest to most formulators who want to market a product of broad utility.

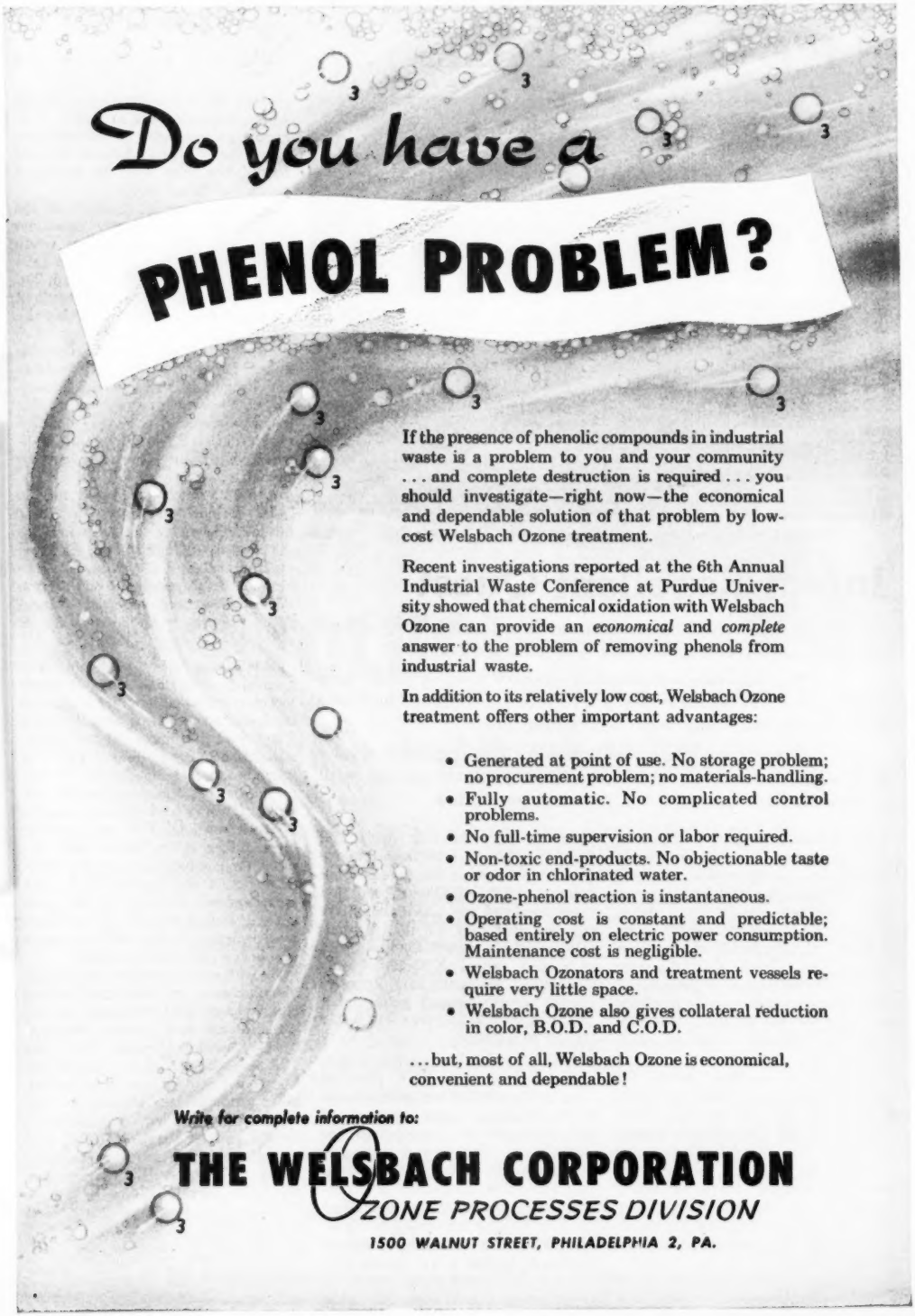
For these reasons, products on the market today are largely based on compounds that proved their worth during the past war, and which have been improved since then. In Dr. Knipling's opinion, the best repellent for use in this country is probably the "6-2-2" formulation, consisting of 6 parts dimethyl phthalate, 2 parts Indalone (*n*-butyl mesityl oxide oxalate) and Rutgers 612 (2-ethyl-1,3-hexanediol). A common variation of this employs dimethyl carbate (dimethyl cis-bicyclo (2,2,1)-5-heptene-2,3-dicarboxylate) in place of dimethyl phthalate.

Other products are based on the "448" formulation which the Navy, but not the Army, has accepted for use. Active ingredients are 2-phenyl cyclohexanol and 2-cyclohexyl cyclohexanol. Some people are sensitive to this mixture, and repeated dosages within short intrevals should be avoided.

One Alone: Either Indalone or Rutgers 612 alone is an effective repellent for a limited number of insects for a limited period of time, Knipling states, and they have enjoyed public acceptance. In fact, Rutgers 612* (or ethyl hexanediol) is one of the few chemicals that organic chemicals producer Carbide and Carbon markets under its own label at the consumer level, selling it as "6-12." Only last week, the company came to the rescue of bug-bedeviled Batavia, N. Y. with an emergency shipment of the product for shelves stripped of repellents by consumers coping with an unusually heavy spring insect horde.

As with most specialties these days, manufacturers are looking at aerosol containers to add consumer appeal. At least one such product, Repel-A-Mist of Knapp-Monarch, St. Louis (*CI, June 1950*), is on the market. Carrying this idea one step further, other producers are working on suntan-insect repellent combinations, though none is yet commercial. Protection from both sun and insects at the touch of a valve, they reason, should be very salable.

* Developed at New Jersey State Agricultural Experiment Station, Rutgers University, by entomologist Philip Granett working under a Carbide grant in collaboration with Carbide chemists. Granett's "cage test" method for testing repellents (*see cut*) is now standard; his work won him title of "world's most bitten man", led to "tailor-making" ethyl hexanediol as repellent.



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Silicone Sortie

E. F. Drew is plunging into the retail field with Gleem, a new silicone car polish that can be washed with soap and water. In declaring itself "in" on the $26 million automobile polish market, the company is shooting for national distribution with an area-by-area sales campaign. Also in the cards are other silicone-based specialties.

Although Drew is perhaps best known for its basic chemicals such as fatty acids, detergents and emulsifiers, for 14 years its auto service division has been selling such specialties as radiator cleaners through service stations. A car polish, therefore, is a natural starter for its venture into regular retail channels, and Gleem is now bouncing up before consumers in groceries, drug chains, department stores and hardware shops. The current big push is directed at markets in Newark, N.J., and neighboring areas as a step toward national distribution.

Biggest selling point for Gleem is that it can be washed with soap and water. (Most other silicone polish makers caution against this.) Emulsifier-wise Drew has put its experience to good use, come up with a stable emulsion embodying this unique feature. Containing 4% GE silicone, cellulose floss abrasive and solvent, in addition to the emulsifier, the product is non-streaking, corrosion-resistant and opaque to ultra-violet light. Any wax content is disclaimed.

Like other silicone-containing polishes, Gleem is claimed to cinderella autos with a six-month coating of "liquid glass." Here Drew is capitalizing on the connection between silicone and silicon (dioxide), from which glass is made, to sell an already silicone-conscious public on the merits of these organosilicon compounds that have been so profitable for producers Dow Corning, General Electric and Linde Air Products. Not only have such polishes for both cars and furniture become major chemical specialties, but some auto manufacturers, notably Ford and Chevrolet, are delivering cars with a silicone polish finish.

One at a Time: In entering the silicone sphere of merchandising magic, Gleem (89¢ for 8 oz. container) is up against mountainous competition for the $26 million prize represented by the market for all types of arto polishes. With a season-length head start are such established national brands as S. C. Johnson's Carplate and Boyle-Midway's Autobrite. Other substantial sellers are Goodenow-Morley's Plasticote *(CW, June 9, 1951)* and Wilco Co.'s Auto Glaze. And Simoniz Co., long-time luminary of the car polishing business with Simoniz, has its Bodyguard in the test-marketing stage.

SILICONE POLISH: Drew's springboard into the retail field.

Drew's strategy for meeting such seasoned competitors is to establish Gleem firmly in one area before moving into the next target territory. Tactically, it seeks to saturate all retail outlets within a given area as it bombards the public with product name, function and price in a series of newspaper ads.

The product was unveiled last July when Drew researchers, who had been working with GE since December, 1950, put their stamp of approval on the formulation. Setting up a late season program, the company decided to select a particularly hard-to-convince section of the populace—the Pennsylvania Dutch—as the first test sample. The actual towns chosen were Bethlehem, Allentown and Reading. Gleem fared well in all.

Successful test-marketing runs in Miami, Fla., this past winter, and in Baltimore and Washington, D.C., the last few months, followed. After striking a healthy punch in the Newark area, Gleem will move on to Maine and other New England sections, with the Midwest a subsequent target. Ground previously broken is being constantly turned over.

Although the company is chary about revealing future research plans for a silicone-based line, with consumer markets being busily lined up, it should be working on allied products. Indications are that one item in particular is almost ready for public trial.

Checks on Drums

Chemical Specialties Manufacturers Association survey shows that steel shortages are spurring more companies to adopt return drum systems; gives fair cross section of practices specialties manufacturers shipping liquids in metal are using to keep track of drums, cut container losses.

H. W. Hamilton, secretary of the CSMA, has just finished tabulating the 71 replies to the questionnaire on returnable steel drums that was sent out to association members, a representative group of manufacturers in the household and industrial insecticide, disinfectant, waxes and floor polishes and soap and detergent fields who ship liquids in metal. Only 8 replying have no returnable drum system; the other 63 have all or part of their drums returned.

The effect of the steel container pinch is evident, for most of the companies have instituted return drum systems only since the steel shortage developed. Of the 63, there are 23 that required return of drums in normal times as well. Three of these were concerned only with such special types of drums such as heavy gauge, galvanized or stainless steel.

Invoicing: Charges or deposits for the drums are placed on the same invoice with the commodity by 52 out of the 63; 6 include the drums in the price; 2 give separate invoices; and 3 did not specify. It was pointed out that where drums are on the same invoice with the commodity, the manufacturer must guard against claims for discounts on drum deposits in cases where cash discounts are allowed.

Time for Return: Time allowance for return of drums for credit varies from 60 days (7 companies) to a year or indefinite periods (40 companies). In-between-times: 90 days (11); 120 days (2); 6 months (2). In some cases, however, the longer period applies only to cities, states, government agencies or institutions. No company using standard containers reported charging rental fees for drums kept beyond the time limit. Charges are made on some expensive specialty packages, however.

Freight Payment: Thirteen companies make the customer pay the return freight, while 47 receive their returns freight collect. Of the latter, a few require these to be returned in

lots of 3 or more. Only 7 have the containers returned to reconditioning plants or regional warehouses; the rest have them sent back to their own plants.

Identification: Thirty manufacturers make no effort to identify drums for return purposes. Those having identification systems use numbers, special stencils, stickers or other color schemes.

Inspection: All but 9 companies give the container some type of inspection upon return. Sixteen companies make no allowance if drums are in poor condition or beyond reconditioning; 6 give partial credit; 37 give full credit regardless of condition.

Cost of reconditioning varies from $.50 to $2.75 per container. The average reported was $1.52. Of those reporting, only 2 make any extra allowances for return of drums in especially good condition, and only 6 charge back to customers any extraordinary expenses involved in reconditioning.

Deposits: There is wide variation on the amount of deposit required. None is required on 10-gallon drums. Following are the amounts (to nearest dollar) charged for containers—disregarding heavy gauge and special types—and number of companies so charging in parenthesis:

55 gal.	30 gal.	15 gal.
$10 (26)	$10 (2)	$6 (2)
8 (5)	8 (3)	5 (7)
6 (6)	7 (1)	4 (2)
5 (11)	6 (5)	3 (1)
4 (1)	5 (6)	2 (2)
3 (1)	4 (3)	
	3 (2)	

In nearly every case, the credit given is that charged for the container on the invoice. In the few instances where the container is charged in the price of the commodity, the return allowance is low.

Drum Life: The average "one time" shipper steel container can make 3-4 trips, according to the average reported. Some companies reported no figures; 3, 17-20 trips; many, 3 trips; and a few, 5 trips.

To spur cooperation on the part of customers, some companies attach notices urging prompt return to invoices or send them out separately.

•

Al Foil Out: Aluminum foil for packaging is out, orders NPA. Foil users formerly under M-7 order are now covered by M-67 which prohibits foil for most uses. Bottle cap liners and other closures regulated by M-26 order and antibiotics packaging are exempt. Drugs and medical supplies cannot use more than they used last year.

•

Water Repellent: Monoseal is the trade name of the new silicone-base water repellent for uncoated exterior masonry developed by Monroe Co. (Cleveland).

•

Metal Conditioner: A primer for ferrous metals, aluminum, and magnesium alloys, called Ferrotite, is the latest product to come out of Baltimore Paint & Color Works (Baltimore). It is said to eliminate the need for conventional chemical metal surface preparation, to provide a corrosion-resistant base for lacquers and other synthetic coatings. It can be applied by spray, dip, brush or roll coater.

•

Wax Dept.: Hans Tobeason, Inc. (N.Y.C.) has opened a new wax department which will specialize in importing and distributing wax and related products.

•

Paint Co. Liquidation: Mason Paint Co., Louisville, Ky., manufacturer, in financial difficulties primarily because of too rapid expansion and a move into a new plant, is being sold to meet claims of about $187,000.

•

Resin Dispersion: Hercules Powder Co. now has available in commercial quantities Dresinol 155, a new nonsolvent type, high-melting resin dispersion that can be used as a modifier and extender for synthetic or natural rubber latices in adhesives, supported films, and binders.

•

Kiwi in Canada: First Canadian plant for Australian shoe polish maker, Kiwi Polish Proprietary, Ltd., is in the planning stage. The company has bought a site in the north Toronto area to produce the polish there. The Kiwi that is now sold in Canada is made in Britain. There is a U.S. plant.

•

Metal-Working Coolant: General Aniline & Film Corp. is now offering Emulsifier STH, a water-soluble, metal-working coolant-lubricant of high efficiency and stability, for cutting, grinding, drawing and stamping operations.

PICTURES IN THIS ISSUE

Cover (top)—Durez Plastics & Chemicals; Cover (bottom)—The Sherwin-Williams Co.; p. 35—Carbide & Carbon Chemicals, Div. Union Carbide & Carbon Corp.

BOOKS . . . . . .

Organic Reactions, Volume VI, edited by Roger Adams. John Wiley & Sons, Inc., New York, N.Y.; 517 pp., $8.

Like the first five volumes, this sixth volume of the Organic Reactions Series deals with important reactions, chosen with regard to their value in current research. Each chapter is written by an expert on the subject, but all material is presented from the preparative viewpoint, with emphasis on limitations, interfering influences, effects of structure and the selection of experimental techniques. Topics covered include the Stobbe condensation, the preparation of thiazoles, reduction by lithium aluminum hydride, the Oppenauer oxidation, etc.

Introduction to Paint Technology, by members of the Oil & Color Chemists' Association. The Chemical Publishing Co., Inc., New York, N.Y.; 157 pp., $3.25.

Every aspect of the manufacture of paints is covered in this book—from the raw materials used to the finished paint and lacquer. Treated here are paints, enamels and other pigmented finishes, their application and testing, their defects and hazards. In discussing the manufacture of finishes, the authors also explain the operation and types of paint mills and the mixing and thinning equipment used in these industries.

Acetylene, by Pierre Piganiol; translated by Frederick A. Hessel and John B. Rust. Mapleton House, Brooklyn, N.Y. 375 pp., $10.

Based on the second French edition of "Acetylene, Homologues et Derives," this American edition presents the basic principles of acetylene chemistry in addition to the newer Reppe acetylene chemistry The author deals with details of industrial processes as well as theoretical aspects. Also covered here are problems of preparation, properties and reactions of acetylene —reactions include all those involving monologs and derivatives of acetylene as well as those of acetylene itself.

Science French Course, by C. W. Paget Moffatt and revised by Noel Corcoran. Chemical Publishing Co., Inc., New York, N.Y.; 331 pp., $4.75.

Aimed at the science student with no previous knowledge of the language, this book is a self-teaching manual for learning how to read and understand scientific French within a short period of time. Articles, abstracted from the most recent technical and scientific literature, include every branch of science—chemistry, physics, botany, zoology, geology, physiology, anthropology, military science, etc.

Briefly Listed

INDUSTRIAL MEDICINE ON THE PLUTONIUM PROJECT, edited by Robert S. Stone, an addition to the National Nuclear Energy Series describes the medical program for plants and industries comprising the Plutonium Project. The first part of the book consists of a general review of the establishment and functioning of this medical organization while the second part contains scientific reports on the subject of irradiation and its effects on personnel. Published by the McGraw-Hill Book Co., 330 W. 42nd St., New York, N.Y., at the price of $6.25.

DIRECTORY OF BIOLOGICAL LABORATORIES, 5th edition, 164-page volume revised and enlarged to include more than 1,000 laboratories of this country and Canada, with the principal contents devoted to the research and development departments of the manufacturers of food, feed and nutrition products, of pharmaceuticals and chemotherapeutics, biochemicals, etc. Published by Burns Compiling & Research Organization, 200 Railway Exchange Bldg., Chicago 4, Ill. Price: $3.

UNDERGROUND GASIFICATION OF COAL IN POST-WAR EUROPE, a report which first appeared in an Italian scientific journal, reports developments in Soviet Russia's coal industry, indicating that the Soviets are producing at least 111 million cubic feet of gas per hour via this method. Available from the Accurate Translation Service, Inc., 711 Woodward Bldg., Washington 5, D.C., at $15 per copy.

THE ENGINEERING INDEX, a reprint of volumes from 1928 to 1949, now out of print, containing annotated reference items of technical, scientific, and economic problems as recorded in current engineering literature of the time. The Johnson Reprint Corp.; Price: Set, 1928-1932—$300, Set, 1933-1949—$900, single volumes either $60 or $70.

MEETINGS . . .

Summer Seminar in the Chem. of Nat. Products, Univ. of New Brunswick, Fredericton, N. B., July 10-14.

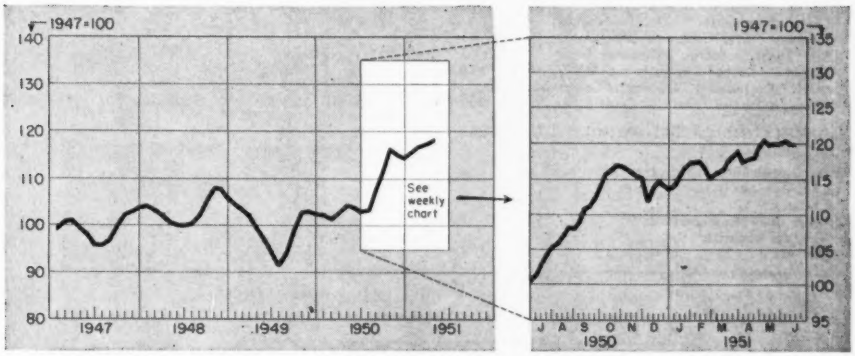
Gordon Research Conference (AAAS). New Hampton, N. H. July 23-27.

Society of Chemical Industry, 70th Annual General Meeting. London, England, July 9-13.

American Chemical Society, Diamond Jubilee Meeting, 120th National. New York City, Sept. 3-7, 1951.

International Congress of Pure and Applied Chemistry, XIIth. New York City. Sept. 10-13, 1951.

CHEMICAL MARKETS . . .



CHEMICAL INDUSTRIES OUTPUT INDEX — Basis: Total Man-Hours Worked in Selected Chemical Industries

An important market development this week: Prices of chemicals are now approaching a stabilized level, after falling for the past six weeks. As previously indicated here, production during the same period achieved a plateau even earlier. When the Controlled Materials Plan really takes hold, demand for chemicals needed for the mobilization program will mount.

Whether prices will rise or fall depends, of course, on whether demand forges ahead faster than the new production capacity can rise to cope with it. Best estimate now: prices will tend to climb the latter part of 1951.

The Office of Price Stabilization in the next few months will try to set up and maintain additional ceilings under CPR-22, with tailor-made price ceilings where and whenever feasible. Manufacturers who did not raise prices appreciably before the general price freeze of last January are reported to be among the earliest to sign up for CPR-22.

Still pending on the OPS agenda: a tailor-made price ceiling for glycol- and alcohol-type anti-freeze; a revised ceiling for naval stores, that producers, with crossed fingers are hoping will hit $40 a barrel for crude gum, compared to the $33 a barrel value today.

Meetings of industry and the National Production Authority are showing evidence of results. Some early targets for mutual action: improving defense order distribution for phthalic anhydride; surveying methods of increasing production of naphthalene, phthalic raw material.

Here's a note of caution: at least six months will elapse before any significant upturn in phthalic supplies can be counted on.

In another Washington corner, the Reconstruction Finance Corporation has just completed a deal to barter aviation gasoline to Western Germany in return for 7.5 million gallons of desperately-needed benzene.

This amount, though a trickle compared to the 40 million gallon shortage, will be a boon to U.S. industry in this period of drought.

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	120.5	120.5	104.2
Bituminous Coal Production (Daily Average, 1000 Tons)	1,654.0	1,613.0	1,755.0
Steel Ingot Production (Thousand Tons)	2,063.0	2,063.0	1,929.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	140.1	140.9	114.1
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	236.9	235.6	194.9
Chemical Process Industries Construction Awards (Eng. News-Record)	$20,595,000	$8,795,000	$6,710,000

MONTHLY INDICATORS—WHOLESALE PRICES (1926=100)	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	172.1	172.4	146.4
Chemicals and Allied Products	144.3	146.4	117.1
Chemicals	138.2	138.2	116.4
Drugs and Pharmaceuticals	184.5	185.1	122.0
Fertilizer Materials	117.8	118.1	117.4
Oils and Fats	198.7	214.6	127.5

Still more benzene relief is provided by the arrival of 300 thousand gallons on the West Coast from Hawaii. By-product of petroleum cracking, the benzene is sold under contract to the Stauffer Chemical Company for the manufacture of chlorinated insecticides at Henderson, Nevada.

Other plans to beat the aromatic shortages keep cropping up: Shell Oil Company expects to turn out 19 million gallons of benzene annually at the Pasadena, Texas refinery, sometime late next year.

Dow Chemical Company has just awarded an $8 million contract to Stone & Webster for construction of a vinyl toluene plant at Midland, Mich. This dividend for 1952 will help stave off further benzene shortages, make more styrene available to the sorely-tried plastics industry.

Good news is nearer at hand for phenol consumers. With the Bakelite plant now going full speed, and several others on the way, best estimates now point to the end of 1951 as a time for buyer rejoicing.

Headline-dodging furfural is in the spotlight with two-fold news: The Defense Production Administration has granted the Quaker Oats Company a five year tax write-off for 60% of a new $4 million production unit.

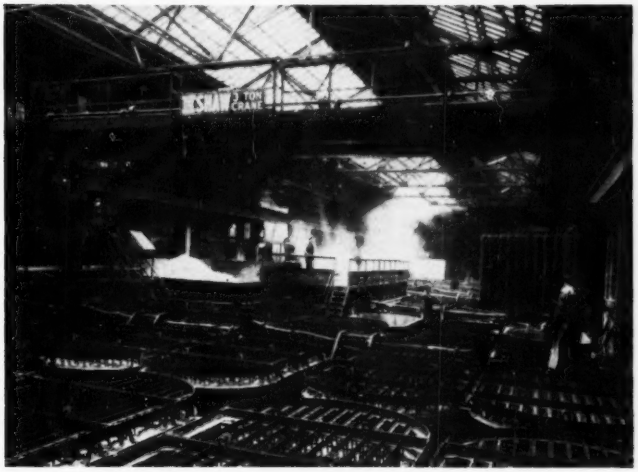
This week, Quaker Oats applied a 1¢ a pound across-the-board increase to furfural and its derivatives, furfuryl alcohol and tetra-hydrofurfuryl alcohol. Furfural prices in tankcars are now 10½¢ a pound. The increase, first in over five years, is attributable to higher manufacturing costs.

In other cases, June is proving a good time for chemical bargains. On the same day, Du Pont reduced prices on gasoline anti-oxidants by 5-6%; and Tennessee Eastman Company, in taking over direct sale of its gasoline additive line, forecasts cost reductions.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending June 18, 1951

	Change	New Price		Change	New Price
UP					
Candelilla Wax, crude	$ .01	$ .76	Rosin, gum, WW, Savannah, cwt.	$ .70	$ 9.85
Eucalyptus Oil, 80-85%	.15	1.60	Shellac, Lemon No. 1	.02	.57
Furfural, tankcars	.01	.105	Turpentine, Savannah, tanks, gal.	.015	.79
Furfuryl Alcohol, tankcars	.01	.19			
DOWN					
Copra, Pacific ports, ton	5.00	180.00	Tin	.18	1.11
Rapeseed Oil, tankcars	.01	.26	Tung Oil, domestic, tanks	.01	.385

All prices per pound unless quantity is stated



REFINER COPPER SULFATE: Consumers look here for more as . . .

Exports Shrink Stocks

Overseas demand plus U.S. needs outrun producer capacity, cause stocks to dwindle.

Producers from refinery byproduct and from copper scrap face knotty economic problems.

Prediction: cutback in exports until stocks build up; more copper sulfate from refiners.

Any supplier of copper sulfate today can feel the economic tug between domestic needs and the lucrative foreign market. First and foremost a chemical needed in agriculture, the call for copper sulfate is world-wide. And since the United States is far ahead in production, the cash and clamor of overseas customers have their impact on the available supply.

The combined demand here and abroad has progressively reduced producers' stocks until today they are down to one week's production. In this pinch, some drastic measures may be required to safeguard supplies until a safer backlog can be rebuilt.

More copper sulfate is potentially available but economics sets a barrier on this expansion. Before Korea, about two-thirds of the copper sulfate made in the United States was obtained from scrap and the rest from refinery operations. But those who make it from scrap are finding the obstacles tougher all the time. An active black market in copper scrap for metal fabrication gives these producers steep competition.

Government Steps: Shortly after the Office of Price Stabilization set a ceiling price of 24½¢ a pound on copper (delivered Connecticut Valley), it was soon evident that the simultaneous demands of defense and civilian needs could not be met from domestic production alone. Financial incentives have since been extended to the Chilean government, whose deposits are mined chiefly by U. S. companies. A 3¢ a pound subsidy is now paid to encourage this flow U. S.-ward; as a further inducement, the long standing 2¢ a pound import levy has been set aside until further notice.

The Controlled Materials Plan, slated to take effect in July, is meant to provide copper supplies equitably for mobilization. Copper sulfate consumer, backed by the influential Department of Agriculture, can put up some cogent claims for priority. One thing is sure: if domestic needs are not satisfied, government restrictions on copper sulfate exports will get serious consideration.

Makers' Fix: Any restrictions on copper sulfate exports at present are on a voluntary basis, and as a result large amounts are leaving the country via the resale market. Major producers are trying to keep exports down. At least one refuses to sell if an overseas destination is involved. According to this source, any legitimate domestic use will be taken care of, whether contract or spot buyer. Prices fixed by the OPS for copper sulfate are between $8.95-9.95 a cwt. depending on quantity and manufacturer. This is a good distance away from the $13-14 a cwt. that resellers are getting from the export market.

Despite the demand, it has become apparent that copper sulfate producers have no sinecure. Producers from scrap copper are getting a double dose of trouble. First, is the shortage and high price of scrap; second, the difficulty of getting sulfuric acid. As a result, one producer went broke, one discontinued operations, and several are handicapped by raw material problems.

Refiners who make by-product copper sulfate have economic problems rather than material shortages to contend with. During the year since Korea, Phelps-Dodge tripled production of the by-product copper sulfate. But further expansion at present copper prices is a venture of dubious promise.

Down-to-Earth: The output of these producers is in wide and growing demand for agriculture, both as a fungicide and crop aid. It is needed for treating most of the important crops — from apples to potatoes. Heaviest exports are headed for Central American countries, whose banana crop and humid climate make fungi thrive. Recently, more-than-usual inquiry protecting the vineyards of France and Italy points up the urgent needs of European countries as well.

Agricultural uses currently absorb about 60% of the copper sulfate consumed, allowing for the large amounts for export purposes. Several other uses depend on fungicidal or algaecidal properties, such as water purification and copper paints. The remainder is required for such essential uses as the cuprammonium rayon process, petroleum sweetening, and the manufacture of other copper compounds.

Stocks Down: Between unrestricted exports and growing domestic needs, stocks are now almost depleted. According to the Bureau of Mines, production of copper sulfate in March was higher than any month since 1946. But the sober fact remains: exports are moving out faster than production can replace.

During 1950, exports amounted to one third of domestic output; in the

first quarter of this year, the ratio is close to 40%. With stocks at the lowest level of recent years, domestic consumers may soon put up a public squawk, if exports take a lopsided share of the total production.

Around the Corner: Some government action will probably be needed to dislodge the copper sulfate logjam. Most immediate relief, of course, would follow export restriction to improve domestic supplies and insure sufficient amounts for mobilization. Drastic export curbs are probably not required, and in any case would be resisted by the ECA.

If more production is necessary to take care of all customers, it is not unlikely that the OPS may liberalize the muddled copper price policy. A higher ceiling price on copper or copper sulfate would be a strong incentive to the copper refiners. On the other hand, producers from scrap would be heartened by a higher copper sulfate ceiling, or a lower ceiling on scrap. In the long run, the prospects seem to favor the relative growth of copper sulfate from the refiner to fill the bill.

Call For Cresylic

Only the most optimistic of U.S. spot buyers will count heavily on imported cresylic acid in the months to come. Reason: A European sellers' market. One of the largest importers, of cresylic, who has just returned from a month-long personal survey of European production, finds most producers over there completely sold out for 1951. Considerable business in fact, has already been booked for 1952.

In-coming: These on-the-spot findings confirm the experience of the two or three other major importers on this side of the Atlantic. They report that attempts by foreign producers to expand output have met those pesky twins: raw material shortages and inflated equipment costs. And there is scant evidence that more of the production is going to European industry, especially since this commodity has been developed for the dollar-plush U.S. market.

Import flow has been relatively steady for the past two years at around 3.5 million gallons annually, mostly (about 3 million gallons) from the United Kingdom. In 1950, something like 300 thousand gallons were brought in from Czechoslovakia, a less abundant supplier this year.

Line-of-duty: According to U.S. tariff regulations, cresylic acid is subject to rather high duty, where higher-boiling tar acids are admitted duty-free. It is not surprising, then, that the imported cresylic acid is not really cresylic acid, but a mixture of xylenols. To meet the non-dutiable requirement, at least 75% of the imported product must distill above 215 C.

Although not as valuable as cresylic acid for some applications, the uses for the high-boiling imported product continues to expand, spurred by the acute domestic shortage of phenol-like products. European producers have their hands full trying to fill this need as well as the genuine demand for the higher boiling tar acids. Most important requirements are for use in plywood adhesives, wire coatings, and aviation engine cleaners.

Budget-news: Over the years, imported cresylic acid prices have shown a tendency to ramble somewhat. A 50¢ a gallon cost-fluctuation has not been at all unusual. Early in 1950, the price was touching bottom at 50¢ a gallon. But since Korean developments, the price has ascended to the level of $1.50-1.60 a gallon now prevalent.

The Office of Price Stabilization clamped on a price lid back in January, and when imports were throttled, finally allowed importers to apply the same dollars and cents markup used in the year preceding Korea. To some extent, of course, this means smaller profit margin because of the higher prices in effect today. But those who had the foresight and the storage capacity early last year aren't feeling the squeeze yet.

GOVERNMENT NEEDS

Bids Close	Inv. No.	Quantity	Item
General Services Administration, Region 3, Washington 25, D.C.:			
June 26	5G-690	500 gals.	interior oil paint, ready-mixed

GOVERNMENT AWARDS

Item	Supplier	Location
New York Quartermaster Procurement Agency, 111 East 16th St., New York 3, N.Y.:		
soap, chip, laundry, high titer	Stahl Soap Corp.	Brooklyn, N.Y.
soap, chip, laundry, high titer	The Procter & Gamble Dist. Co.	Cincinnati, Ohio
soap, laundry, powder, low titer	Continental Soap Corp.	Chicago, Ill.
mildew preventive tablet, volatile 1 lb. package	Van Brode Milling Co., Inc.	Clinton, Mass.
Armed Services Medical Procurement Agency, 84 Sands St., Brooklyn, New York:		
methantheline bromide tablets	G. D. Searls & Co.	Chicago, Ill.
procaine penicillin "G", crystalline in oil w/aluminum monesterate	Chas. Pfizer & Co.	Brooklyn, N.Y.
Navy Purchasing Office, New York, N.Y.:		
sulfuric acid	Stauffer Chemical Co.	San Francisco, Calif.
glycerin	Nagle Rubber & Chemical Corp.	Brooklyn, N.Y.
Headquarters, Air Materiel Command Wright-Patterson Air Force Base, Dayton, Ohio:		
fiberglass fabric cl-2l	Seymour Wallas & Co.	St. Louis, Mo.
plexiglass items, cl-01F	Great Lakes Mfg. Corp.	Hammond, Ind.
Chicago Chemical Procurement District, 226 West Jackson Blvd., Chicago 6, Ill.:		
barium nitrate, class E	Westvaco Chemical Div., Food Machinery and Chemical Corp.	Cartaret, N.J.
thermite, plain, incendiary and silicon, grade II, class C	Ferro Enamel Corp.	Cleveland, Ohio
Raritan Arsenal, Metuchen, N.J.:		
phosphoric acid, spec. MIL-C-10578	Turco Products, Inc.	Los Angeles, Calif.
same	Continental Chemical Co.	No. Sacramento, Calif.
same	Whitfield Chemical Co.	Detroit, Mich.

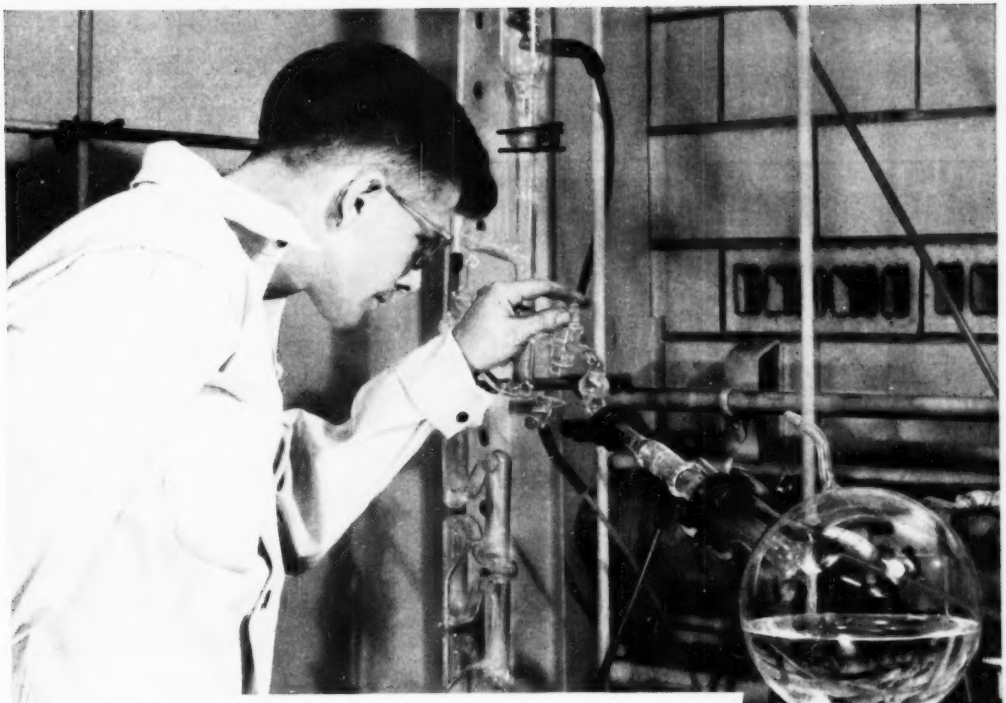
New Organic Peaks

Reams of chemical production and sales figures still emanate from the U.S. Tariff Commission, showing in black-and-white just what the organic chemical industry has accomplished in the last two calendar years. Most of the data is not final, but for all practical purposes gains ranging from 40-60 per cent were registered for 1950 compared to 1949.

It is worth remembering that production dropped steadily during the first six months of 1949 in an "inventory recession." With equal suddenness, the chemical economy snapped out of the doldrums, and output rose almost as fast as it had previously fallen.

The first half of 1950 witnessed a continuation of this ascent. But the Korean campaign pulled out all stops on chemical buying.

D.C. Facts: Among organic chemical commodities reported, surface-active agents rate a close look. Total output in 1950 was 664 million pounds, a boost of 54% over the 430 million pounds of 1949. Sales in the two years show a 60% increase in quantity and 48% in value.



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Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

Editorial Items: — Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

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Natural Gas 29C

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Specification Finishes 48B
Synthetic Optical Crystals 48C

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Mail to Chemical Week, 330 W. 42nd St., N. Y. 18, N. Y.

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Expires September 23, 1951

BOOKLETS . . . . . .

Chemicals

*Surface-Active Agents

Manual on surface-active chemicals used in insecticides and herbicides, designed to help the compounder select the best agent for a particular preparation; all factors to be considered are set forth along with a list of suggested formulations for use in a wide variety of insecticides and herbicides. Antara Products Div., Dept. 53, General Dyestuff Corp., 435 Hudson St., New York 14, N.Y.

Cellulose Gum

Leaflet describing the multiple applications of purified cellulose gum in the ceramic industry, among which are its uses as a temporary binder in sanitaryware glazes, in structural tile glazes, as a glaze binder or jigger body additive in dinnerware, its use in low-tension electrical porcelains, etc. Hercules Powder Co.

Specification Finishes

32-p. leaflet furnishing paint manufacturers and technologists 16 suggested formulations for a number of the more important military specification coatings; formulations include various types of enamels, primers, alkyd resin solutions, varnish, surfacer, lacquer, etc. Rohm & Haas Co.

Synthetic Optical Crystals

32-p. brochure supplying technical information on synthetic optical crystals used for infra-red and ultra-violet optics, piezoelectric effects and short wave radiation detection; data is given on sodium chloride, potassium bromide, optical silver chloride, thallium bromide iodide, lithium fluoride as well as scintiallation counter crystals. The Harshaw Chemical Co.

Equipment

Liquid Processing Equipment

32-p. catalog illustrating and describing the firm's line of stainless steel liquid processing equipment, including filters, filter discs, mixing and storage tanks, portable mixers, agitators and transfer pumps. Each is discussed with reference to construction features, typical installations, design variations, parts lists, and application and performance data. Alsop Engineering Corp.

Pre-Fabricated Piping

8-p. bulletin discussing advances made in the field of high and low pressure piping subassemblies and describing prefabricated piping equipment such as process piping, coils and welded assemblies to be used in the power generation, petroleum refining, pipe line transmission, paper, steel, chemical and heavy industries. Western Piping Supply Div., The Lummus Co.

Pumps

20-p. booklet featuring portable centrifugal pump, explaining its construction and advantages; other pumps covered include electric motor driven pumps, pumps without power, and diaphragm pumps. Chain Belt Co.

Pyrometer

4-p. bulletin describing various models of pyrometers for both low and high temperature applications and noting thermocouples to be used with each type. Claud S. Gordon Co.

Platecoils

Technical manual providing the engineer with the principal data required in the solution of heat transfer problems, and giving information on the use of platecoils as a medium of heat exchange; charts and formulas serve as an aid in making the basic calculations of industrial heating and cooling applications. Kold-Hold Mfg. Co.

Nitroneal Generator

Data sheet describing operation and applicability of generator designed to produce pure nitrogen inexpensively with a controllable hydrogen content. Minneapolis-Honeywell Regulator Co.

Electrical Fittings

Catalog-price booklet containing illustrations, catalog number, price and weight of the firm's line of electrical fittings with all information indexed in three ways—by photo, product name and catalog number. O. Z. Electrical Mfg. Co.

Instrumentation

Non-technical booklet dealing with the role of instrumentation in every-day life in its various capacities of testing, measuring and controlling products and operations throughout all industry and trade; booklet covers firm's products in more than a dozen fields. Weston Electrical Instrument Corp.

Spectrophotometers

Booklet explaining the principles of spectrochemistry in addition to the workings of a spectrophotometer for doctors, chemists and students interested in either clinical or industrial spectrochemistry. Coleman Instruments, Inc.

Materials Handling

24-p. booklet setting forth in humorous fashion rules to follow for safe and efficient industrial truck operation directed at users of fork-lift trucks and industrial towing tractors. Clark Equipment Co.

Fire Extinguisher

Folder presenting firm's line of portable and special purpose fire extinguishers in addition to guide-chart for selecting the right extinguisher for every type of fire hazard in industry, institutions, and the transportation field. Stop-Fire, Inc.

* Request must be made to company on business letterhead.

ADVERTISER'S INDEX

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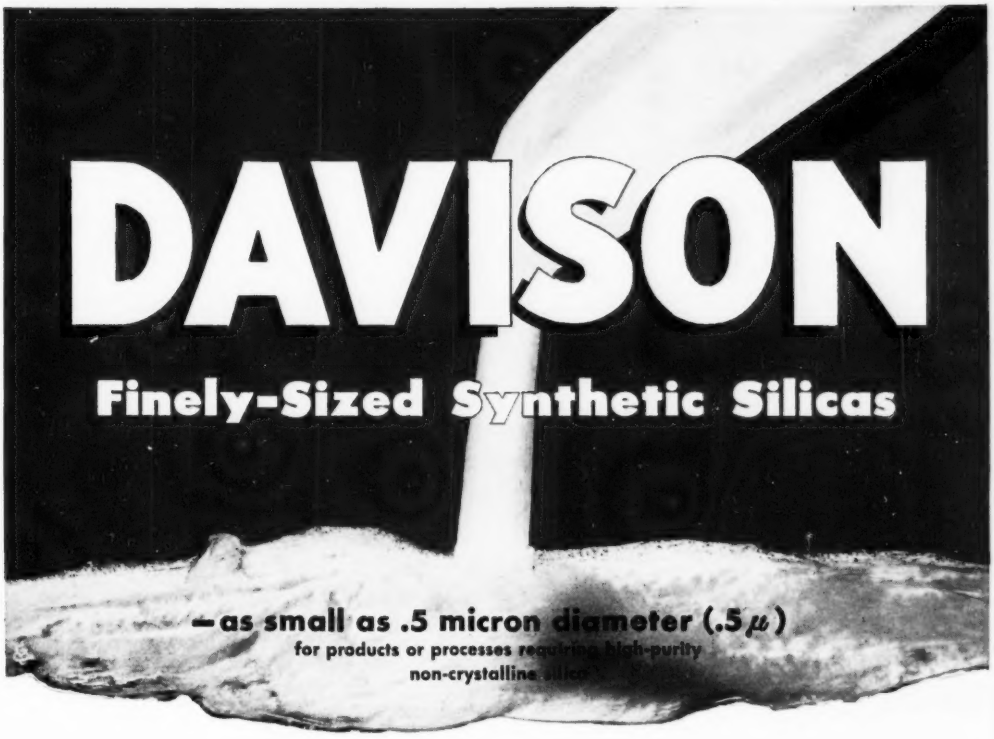

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If you need a finely-sized, non-crystalline synthetic silica of high purity, write for information, specifications and samples of Davison silica gel. We will be happy to give you our recommendations based on experience and research. Mention your proposed application when writing.

Properties: HIGH PURITY ● CHEMICALLY AND PHYSICALLY INERT ● CONTROLLED ADSORPTIVE CAPACITY ● CONTROLLED DENSITY ● FREE FLOWING ● SURFACE AREAS UP TO 1000 SQUARE METERS PER GRAM

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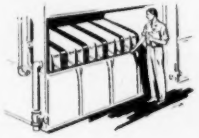
As a Leveling Agent in the Bath



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HIGH PURITY—Due to rigid manufacturing quality controls, General's Anhydrous Glauber's Salt consistently assays 99.9% Na_2SO_4.

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